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THE PEDAGOGICAL SEMINARY AND

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Child Behavior, Animal Behavior, and Comparative Psychology

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Acc

AUHOR INDEX

Ames, Louise Bates 139
Child, Arthur 293
Crain, Loren 217
Birren, James E 313
David, R T 305
Denenberg, Victor 123
Edelston, H. 85
Fox, Charlotte 313
Harlow, H F. 305
Kline, Milton V 129
Marston, Mary-Vesta 25
Morlan, George K 257
Orland, Frank 133
Phillips, E Lakin 61
Pickford, R W. 231
Posey, H Tharp 133
Ross, Sherman 117, 123
Scott, J P. 25
Settlage, P. H 305
Shaw, M. E 283
Skodak, Marie 3
Smith, Wendell I 117, 123
Spiegel, Leo 11
Waters, R. H 283
Wells, Charles A 321
Wells, F L. 153, 187, 267
Werner, Heinz 217
Zeligs, Rose 73

TABLE OF CONTENTS

Mental growth of adopted children in the same family . 3
By Marie Skodak

The child's concept of beauty: A study in concept formation 11
By Leo Angelo Spiegel, M.D.

Critical periods affecting the development of normal and maladjustive social behavior of puppies 25
By J. P. Scott and Mary-Vesta Marston

Intellectual and personality factors associated with social class attitudes among junior high school children 61
By E. Lakin Phillips

Children's concepts and stereotypes of Polish, Irish, Finn, Hungarian, Bulgarian, Dane, Czechoslovakian, Hindu, and Filipino . . 73
By Rose Zeligs

Educational failure with high intelligence quotient: A clinical study . . . 85
By H. Edelston

The effect of continued food deprivation on hoarding in the albino rat . 117
By Wendell I. Smith and Sherman Ross

A preliminary study of individual and group hoarding in the white rat 123
By Sherman Ross, W. I. Smith and Victor Denenberg

SHORT ARTICLES AND NOTES . . . 129

Hypnotic age regression and intelligence (Milton V. Kline) . . 129

Relation of cranial electroshock to convulsive and maze behavior in the white rat (Frank Orland and H. Tharp Posey, M.D.) . . 133

BOOKS 137

CRITICAL REVIEWS OF RECENT BOOKS . . . 139

Sheldon, W. H., *et al.* *Varieties of Delinquent Youth: An Introduction to Constitutional Psychiatry* (Reviewed by Louise Bates Ames) . 139

BOOKS RECENTLY RECEIVED 149

College survivals and non-survivals at marginal test levels. Cases LVII-LXXXIV 153
By F. L. Wells

Some projective functions of simple geometrical figures. Cases LXXXV-XCV . . . 187
By F. L. Wells

Hoarding behavior in the golden hamster (*Mesocricetus auratus auratus*) 211
By Wendell I. Smith and Sherman Ross

The development of visuo-motor performance on the marble board in normal children 217
By Loren Crain and Heinz Werner

Aspects of the psychology of meaning . . . 231
By R. W. Pickford

An experiment on the identification of body odor . . . 257
By George K. Morlan

Instruction time in certain multiple choice tests. Cases XCVI-CII . 267
By F. L. Wells

An experimental test of latent learning in a relatively free-choice situation 283
By M. E. Shaw and R. H. Waters

The sociology of perception 293
By Arthur Child

Performance of normal and brain-operated monkeys on mechanical puzzles with and without food incentive 305
By R. T. David, P. H. Settlage, and H. F. Harlow

The differential decline of subtest scores of the Wechsler-Bellevue Intelligence Scale in 60-69-year-old individuals . . 313
By Charlotte Fox and James E. Birren

BOOKS 319

CRITICAL REVIEWS OF RECENT BOOKS . . 321

Lowenthal, L., & Gutterman, N. *Prophets of Deceit.* (Studies in Prejudice Series.) (Reviewed by Charles A. Wells) 321

BOOKS RECENTLY RECEIVED 325

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BOOKS RECENTLY RECEIVED 149

The Journal of Genetic Psychology, 1950, 77, 3-9

MENTAL GROWTH OF ADOPTED CHILDREN IN THE SAME FAMILY*

Iowa Child Welfare Research Station

MARIE SKODAK

The extent to which children in the same family resemble each other has been of considerable interest to social agencies, educators, and parents as well as psychologists, and a substantial body of research has been accumulated on children who are natural siblings It is possible that a study of the mental growth of children not genetically related to each other or to their foster parents but brought up as members of a family unit, would be of some value. Not only may such studies cast some light on nature-nurture problems, but they have practical value in daily life. Child placing agencies faced with the task of placing one child in an adopting family would like to know whether the differences between the foster siblings are likely to be greater than the differences between natural siblings. Adoptive parents would like to know whether there is a wider range of mental talent among their children than is the case in natural families.

This is a brief report of data available in connection with a long time follow-up of adopted children (7, 8). The children had been placed by two state-wide child caring agencies in Iowa and were included in the study if they met the following criteria: (*a*) The child was placed in an adoptive home under the age of six months. (*b*) The child had been given an intelligence test prior to November 1936 (*c*) Some information, though of variable amount and reliability, existed concerning the natural and the adoptive parents (*d*) The child was white, of North European background

The study was not designed originally to compare the mental development of children in the same environment, but rather to follow the growth of the same adopted children over a period of years. It was not even anticipated that the children who were the focus of attention would have foster siblings in any considerable number After the study had been in progress, however, it was found that a number of siblings did exist and wherever possible these children, too, were included in the mental testing program

When the study began in 1936, 180 children representing 178 families

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were involved. On subsequent examinations the sample was reduced through changes in address, withdrawal from further participation, and inability to arrange satisfactory schedules for the tests, until in 1946 100 children were seen for a final examination (8).

The present sample is based on information available in 1946 on a total of 98 families. These cases represent families who were originally consecutive cases in the files of the agencies and it is reasonable to assume that they are, or were at the time, representative of families into which infants were placed for adoption. Previous studies of the cases lost from the original sampling (6, 7, 8) did not show the presence of systematic bias. In any event the selection and the reduction in numbers was based on factors other than the presence or absence of more than one child in the home.

Since there is little published material on the incidence of foster sibships, the data of Table 1 are of interest.

TABLE 1

Total number of families in long-time follow-up	98
Number of families with only one adopted child	52
Number of families who had adopted two children	31
Number of families who had adopted three children	2
Number of families who had had one child of their own, then adopted one child	1
Number of families who had one child of their own, then adopted two children	1
Number of families who had adopted one child, then had one child of their own	7
Number of families who had adopted one child, then had two children of their own	3
Number of families who had adopted two children, then had two of their own	1

It is interesting to note that in this sampling of adoptive families the number of instances in which there are two or more children is considerably greater than is usually thought to be the case. While adopted children are only children in 52 of the 98 families, in nearly as many instances adoptees have problems of sibling adjustment, as do children in natural families.

Of the 46 adopted children in fraternal settings, 13 had the supposedly more difficult task of adjusting in a situation where at least one child was the adopting parents' own child. Observation of the adjustment of the children in these families did not reveal unusual tensions or problems and there seemed to be no open favoritism or partiality. Characteristically, parents who had adopted more than one child or who had mixed families, were themselves exceptionally well adjusted, loving and warm. Not only did their affection take in their own families, but included neighbor children and the friends of their children, with much casual visiting, freedom of movement, and of emotional expression.

In the 10 instances where there were own children after the adoption of a child, the adopting parents had had reason to believe that they could have none of their own. Since it is general practice among children's agencies not to place infants in homes where there is a reasonable possibility that parents may have children of their own, both the parents and the agencies had accepted this belief and had been guided by it. In about 10 per cent of cases adoption of infants was followed by the birth of their own child after an interval of one to 10 years. The proportion would be considerably higher if cases in which specific surgery had occurred were subtracted from the sampling.

This number of children gave 22 pairs of adopted-and-own and 41 pairs of adopted-and-adopted combinations, since each child could be matched with all other children in the same household.

Because of the differences in ages between siblings, and because some of the sibs had had only one test while all the adopted children in the main study had had four or more examinations, it was not possible to match all of the children by exact age at test. Because of the limitations of the data, exhaustive statistical comparisons are not feasible. Two types of comparisons are presented, however.

For correlational comparisons one test was selected for each child If only one test was available for the sibling, that test was selected for the adopted child which most nearly matched the sibling's test as to chronological age at examination. If more than one test was available for both children, tests given at the oldest age were selected. In no case was there more than three years difference between chronological ages of the adopted siblings at the time of their respective tests. The age range of the children was from 3 to 14 years with the majority of the pairs between 6 and 13 years at the time of examination. For example, the test results of Jim, secured when he was 12 years old in 1942, would be paired with his adoptive sister Jane's, who was 11 years old in 1946.

The results of the 1916 revision of the Stanford-Binet were used throughout, since these were available for all children while the 1937 revision was available only for those over 10 years of age The *IQ*'s of the 76 adopted children ranged from 95 to 142 except for one pair of children whose *IQ*'s at the age of 13, were 72 and 80 respectively. The mean *IQ* of the adopted children in the original study was 107 and the mean *IQ* of their adopted siblings was 112, with a mean of 109 for the total group of 76 children involved. It had been found that the adopted children in the long term study were consistently above the average of the general population in intelligence, and it is apparent that other foster children in the same homes show a similar superiority in intelligence.

The correlation coefficient between the *IQ*'s of pairs of adopted siblings tested at approximately the same ages in the preadolescent years is .65±.06.

In the 22 pairs of adopted-own children, 17 adopted and 17 own children are involved. Age differences between own and adopted pairs of children were greater than for the adopted-adopted pairs, but in no case exceeded six years. The own children range from 100-125 in *IQ* with a mean of 112, while their adopted siblings range from 90 to 134 in *IQ* with a mean of 110. In view of the small numbers of cases and the markedly restricted range of scores, especially of the own children, correlational analysis is of little practical value. However, the product moment correlation for the 22 pairs was .21±.13

Most studies of siblings show a correlation of approximately .40 to .60 (1, 2, 4, 9, 10) with the correlations increased only after statistical corrections of the raw data These studies, too, are faced with similar problems of pairing tests by ages of the children. Sweeping generalizations based on 41 pairs of adopted children are not justified, but it seems reasonable to conclude that adopted children resemble each other in intelligence as closely as do natural children, if, as in these instances, placement of both children occurred during early infancy and the family experienced no more than ordinary changes.

Conclusions cannot be derived from the own-adopted child pairings because of the small number of cases. However, the real differences in mental level are small, with a maximum of thirty points in *IQ* between the most extreme pair of children. In this instance, the adopted child, at 10 years, had an *IQ* of 98, and the own child, at 4 years, had an *IQ* of 129.

The second type of comparison consists of the presentation of data in graphic or tabular form. Those instances have been selected in which both of the pairs of adopted children have had three or more tests, and the own-adopted pairs had two or more tests so that a trend can be discernible.

In general the patterns of mental growth shown in Tables 2 and 3 may be described as similar. Comparison with the mental growth data reported by Olson (3) for natural siblings does not show that natural siblings follow similar patterns more faithfully than do adopted, but unrelated, siblings.

SUMMARY

1. Of a sampling of 98 families with at least one adopted child involved in a long range study, it was found that 46 had two or more children. In 35 families there were two or more unrelated adopted children, and in 13, there were both adopted and own children.

TABLE 2

COMPARISON OF *IQ*'S OF ADOPTED-ADOPTED PAIRS OF CHILDREN IN THE SAME HOME BY AGES (THREE TESTS OR MORE)

	Age																
Pairs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17+
A	110	112		86			104							101			
A1	135		113		97							107					
B	108	90				86							80				
B1	102	90				99							73				
C	135		112			118						118					
C1			99	102				128						126			
D	104			114		104							100				
D1				90			94		95							77	
E	117		112			109							101				
E1				111						98							
F			98		92			107									
F1	102		97			108											
G	114	110	112	115	115	119											
G1		133	135	150	133	134	156										
H		103		102		100	100										
H1					110		116			111							
I			104			107		107							96		
I1	108			124			116						113				
J		117	107			123							108				
J1		134	130			115							100				
K				116		115				130					116		
K1	113		97			101						109					

A, B—adopted child, member of long-time study.
A1, B1—adopted sibling, not original member of long-time study

TABLE 3

COMPARISON OF *IQ*'S OF ADOPTED-OWN PAIRS OF CHILDREN IN THE SAME HOME BY AGES (TWO TESTS OR MORE)

	Age																
Pairs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17+
1a	103			87		103							110				
1b				91							108						
2a		116	133		121			115						97			
2b		126			131						117						
3a			102		107				113						108		
3b							112						112				
4a	126		115			113						90					
4b			109						109								
5a	121			114		115							105				
5b			127							101							
6a	114			133		129							113				
6b					93							105					
7a							112		106			101					110
7b								120						122			
7a							112		106			101					110
7c					107						110						
8a				117		114		119							98		
8b					110							106					

1a, 2a—adopted child, member of long-time study.
1b, 2b—own child of adopting parents

2 Approximately 10 per cent of families had children of their own after the adoption of a child.

3. Adopted children, unrelated to each other, but placed in a permanent home in infancy and brought up as siblings, are as similar in intelligence at comparable ages as are natural siblings (correlations between *IQ*'s of adopted sibling pairs is .65±.06).

4. Judging from a small sampling, adopted children and own children resemble each other in intelligence less than do either adopted-adopted pairs or natural pairs of siblings (correlation between adopted-own child *IQ* is .21±.13)

5. The patterns of mental growth on repeated examinations show a similarity between pairs of children growing up in the same family.

It may be concluded that child placing agencies can anticipate that several children placed in a single home will resemble each other in mental development as closely as do children in natural families. The evidence regarding the relationship between adopted and own children is less clear, since in spite of the low correlation between test scores, inspection of the pattern of mental growth over a period of time does not show differences which would create serious adjustment problems within the family.

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Personnel Counseling Service
Flint, Michigan

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THE CHILD'S CONCEPT OF BEAUTY. A STUDY IN CONCEPT FORMATION*

The Mount Sinai Hospital, New York City

LEO ANGELO SPIEGEL, M.D.

A. PROBLEM AND PROCEDURE

Through an investigation of the esthetic concepts of a group of 37 children in a psychiatric setting[1] an exposure of the dynamic correlations between the structure of the personality and the sense of beauty was attempted. A search of the literature failed to reveal a similar clinical approach to esthetic problems.

The esthetic views of children have been studied by several investigators. The technique is approximately the same in most of the researches to be mentioned. Children of different ages are shown pictures and are asked to arrange them according to their preferences, to give their reasons and at times, to describe the pictures Lack-Horovitz (7) shows that the great majority of children concentrate their preference on a few pictures and that the theme of the pictures is the most essential element in their appreciation. Newcomb (8), who used written compositions, found that form was rarely mentioned The visual element was the most important and, in this category, color appears first, then glitter, and then movement. The subjects chosen were nature, animals, and toys. Persons were chosen with the very low frequency of 2 per cent. Garth and Porter (3), investigating the color preference of children, found that yellow is least esteemed, red is in high esteem, and blue becomes more esteemed with increasing age. Hurlock and Thompson (5) found that the tendency to perceive the specific rather than the general, the tendency to perceive the background, the tendency to perceive details, and the accuracy of perception increased with age. As perception becomes more discriminating, confidence in the ability to draw decreases. Berliner (1) found that children showed no development in esthetic judgment from 3A to 8B. Koerperth-Tippel (6) maintains that the esthetic attitude begins to predominate around the tenth year. The eleventh year marks the transition to a preference for esthetic pictures; under 8 attention

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[1] The material for this investigation was obtained at the Children's Ward (Dr Lauretta Bender, in charge) of the Bellevue Psychiatric Hospital.

is focused primarily on the subject of the picture. Calabrisi (2) finds that the esthetic attitude does not develop gradually with age but seems rather to emerge with the onset of puberty.

To obtain an insight into the relations that may exist between the personality and esthetic concepts it is obviously necessary to work with material of emotional significance to children. An investigation in esthetics which deals with pictures, furniture, or similar objects is not likely to engage substantial interest on the part of the child nor to stir his imagination. But the body, which is closely related both to the esthetic experience and to the structure of the personality, is likely to achieve this end. By selecting body-experience as the research object, possible connections between the esthetic experience and the structure of the personality were likely to be elicited.

A further requirement was that the verbal responses of the children should be comparable. Therefore it was our aim to ask each child fixed and definite questions. After some preliminary experimentation a final set of questions was adopted which was found to be suitable (in the sense above noted) for the children with whom we were working.

At present it is obviously impossible to define beauty in a way that would be universally acceptable. Any definition would arise from personal predilection and would prejudge results. Therefore we thought it advisable to accept any response of the child to our questions on beauty, no matter how apparently irrelevant or absurd. The standard questions were:

(1). I never met your mother. Tell me how she looks.

(2) I never met your father. Tell me how he looks

(3). Tell me how you look.

(4). If you had magic and could make the most beautiful woman in the world, how would you make her look?

(5). If you had magic and could make the most beautiful man in the world, how would you make him look?

(6). If you had magic and could make the ugliest woman in the word, how would you make her look?

(7) If you had magic and could make the ugliest man in the world, how would you make him look.

(8). Is your mother beautiful?

(9). Is your father beautiful?

(10) Are you beautiful?

(11) Whom would you rather play with—a beautiful boy (girl) or an ugly boy (girl)?

(12). Suppose you had magic and could make the best friend you would like to have—how would you make him (her) look?

The answers to the standard questions were noted down verbatim;[2] no suggestions were given to the children but they were encouraged to give fuller answers by saying "What else?" or "And?". The order in which the questions were asked was not fixed but varied with the individual child. The questions were vague enough to permit the child to give free play to his fantasy. After the above questions had been asked, specific questions as to features, and the reasons for the answers were then asked.

The children studied were all in-patients at the Bellevue Psychiatric Hospital who had been on the ward at least 30 days and who had been studied psychiatrically by the writer or by other members of the psychiatric staff. They presented severe problems which could not be adequately studied in guidance clinics and had been referred to the hospital by courts and social agencies Before the children were questioned they had already been examined and were accustomed to ward routine so that the interview took place in a relatively relaxed and natural atmosphere.

Thirty-seven children were studied, 26 were boys with an average of 10.1 years and an average *IQ* of 84.0; 11 were girls with an average age of 10.6 years and an average *IQ* of 84.9.

B. The Area of the Child's Concept of Beauty

1. *Clothes and Hair in Relation to Beauty*

An outstanding characteristic of the children's responses is the relative emphasis they place on clothes and their disregard for individual features. As illustrations of this tendency the following quotations are given:

> *Ann D L*, 8-6, *IQ* 73—Beautiful clothes on her, beautiful rings, diamond jewelry, buy her beautiful slacks She'd go skating every morning. She could make money and buy more clothes
>
> *B. de M.* 8-11, *IQ* 102—Curls on her head, and get her best clothing and everything. Nice hat, those hats in store, good new shoes on her and silk stockings Go out with her.
>
> *G.G* 9-5, *IQ* 88—Like a princess (What else?) A silk dress, glass slippers, silk stockings, silk slip, white underwear, that's all.

Hair is found next in frequency in our material. As with clothes, it is the quantity of hair that the child stresses. To the child it is, perhaps, an extension of clothes. It may be in this sense that the usual negative with which children answer the question: "Do you like bald men?", may be explained. The bald head is an unclothed head. Where there is a loved relative with a bald head or some other specific factor the answer may be in the affirmative as in the case of D.M. who liked bald men:

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[2] The individual protocols for each child are omitted from this paper because of considerations of space

"Sure, it means they're smart, it means they're high priests."

The strength of the usual dislike of bald heads appears very clearly in the response of R.B.

"Not much—I have to like 'em, 'cause one of my uncles has a baldy."

With their emphasis on clothes and hair, the descriptions that the children give time after time, bear an astonishing similarity to descriptions in fairy tales. For example, "So Delicia took off her ugly cap and shook out all her fair shining hair and bathed her hands and face in clear water till her cheeks were like roses and when she was adorned with the diamonds and the splendid robe, the fairy had given her, she looked the most beautiful princess in the world" (10, p. 157).

The emphasis on the *envelope of the body* is so overwhelming one has the impression that children consider beauty something one puts on and takes off with clothes and cosmetics, and not an *inherently intrinsic part* of the body. For example, J. L., white, 9-5, *IQ* 106—

"I'd make her look like a usual girl with better clothes."

Or A. de L., who, in reference to an ugly woman, says,

". . . so old she was getting pimples on her face. So she put some rouge on and she became beautiful."

This point will receive further attention in the "Discussion."

2. *Features in Beauty and Ugliness*

As was previously noted, the number of features in any description is extremely small. However, it is important to obtain an insight into their quality and nature when they are mentioned. Features of beautiful people were *never spontaneously* mentioned, the descriptions of ugly do contain *spontaneous* mention of features.

> *E. P.*, white, 12-0, *IQ* 101—"A nose stretching around the globe and all the teeth were fangs and she had eyes poppin' out of her head and she had serpents for hair and she had a tail. She had no feet, like one foot coming together. Her hands—the bones were sticking out. She had long nails. That's all."
>
> *J. B.*, white, 11-11, *IQ* 93—"O.K. Big buck teeth, that stick out inches, crooked nose, thickest glasses in the world, cross-eyed, her head not shaped right, big finger nails, her arms all bony, crooked legs, shape like a chair, 80 ft. tall, every time she touched somebody they'd die."
>
> *P. N.*, white, 10-3, *IQ* 95—"All his teeth would be fangs and they'd be black instead of white." (What are fangs?) "Pointy teeth that they

> bite right through the body. Animals have fangs About two of his toes broken off and one finger would be broke off. . . ."

Many of the other descriptions of ugly people emphasize distortion and disproportion. To supplement these descriptions of ugliness, some descriptions of features of beautiful people are now given which, it must be stressed, were not spontaneous but were elicited in response to specific questions.

> *J L*, white, 9-5, *IQ* 106—was asked specific questions concerning a beautiful man (what kind of a chin?) "small—if I make a big one some one would flatten it"
>
> *E H*, negro, 8-11, *IQ* 88—was asked about the arms of a beautiful woman (What kind of arms?) "Middle-sized 'Cause if they'd be so long they'd hit people, be in the way, block people"
>
> *P N*, white, 10-3, *IQ* 95—was asked about the hands of a beautiful woman "Wouldn't have long nails" (why not?) "'cause maybe she would stick me and I wouldn't like that."

This patient had been admitted because of an attempt at suicide. He was very preoccupied with all pointed objects such as knives and scissors.

> *R A*, negro, 10-2, *IQ* 93—was asked about the height he would make his beautiful woman He said "about six feet tall." Later on, when asked about the height of his beautiful man, he said: "five feet." When questioned about this difference in height he answered: "'Cause the man might want to beat up the woman and this way the man won't pick on the lady"

This patient lived in one room with his alcoholic mother and his father who used to beat her.

3. *Material Possessions and Beauty*

Beside clothes, other material possessions are drawn into the concept of beauty as can be seen from the following:

> *H negro*, 8-11, *IQ* 94—"She got long hair, she got blue eyes, she got golden things around her arms, a ring, and clothes, she got a good bed, shoes, and a pet bird and she's got a child." The same boy about a beautiful man—"he went out selling He made a lot of money He went home and got her some more clothes He lives in a beautiful house He has lots of books to read"
>
> *B white*, 11-11, *IQ* 93—"I'd give her a nice home, nice coat, get her best of fashions for seasons, go to movies, dances,—make him a hero, travel all over world, if he wanted to he could get married "
>
> *Br. white*, 8-10, *IQ* 98—"I'd fix her up, things what I buy her"
>
> *H K. negro*, 8-5, *IQ* 89—" he can race, and he could win and he can sing He can drive a car"
>
> *K B white*, 8-7, *IQ* 85—"have a nice little car"

Beds, houses, pets, are mentioned in beauty descriptions. Socially approved and prestige bringing activities are also spoken of: driving a car, going to a movie, going to a dance.

4. *Morality and Beauty*

The inclusion of moral qualities in their concept of beauty is pronounced in children and this tendency is well illustrated by their answers to the question.

"Whom would you rather play with, a beautiful boy (girl) or an ugly boy (girl)?" Some typical answers follow:

> *B M. white,* 8-11, *IQ* 102—"a beautiful boy—an ugly boy won't want to do anything. Start to hit you" (why rather a beautiful boy?) "'Cause a beautiful boy won't get into trouble. A ugly boy won't let me do something—puts me out of every place"
>
> *R.B white,* 10-11, *IQ* 81—"A nice looking girl" (why?) "Ugly girls are fresh, play fresh."
>
> *W H. white,* 12-11, *IQ* 64—"Beautiful boy." (why?) "Ugly boys get too wise. Muss up the game."
>
> *M.B white,* 8-9, *IQ* 88—"Beautiful boy." (why?) "because he don't fight—he's kind."
>
> *J.B. white,* 9-2, *IQ* 85—"a beautiful boy." (why?) "Beautiful boys don't play unfair, play right Ugly boys teach you to play unfair, to throw stones, to fight." The same boy when asked if he were beautiful, answered, "not so—a little." (Why not so beautiful?) "Mostly I'm bad, cranky, don't do errands."
>
> *E.H negro,* 8-11, *IQ* 88—"A beautiful boy." (why?) "If the ugly boy plays he might take my balls and throw them away."
>
> *V D. white,* 10-11, *IQ* 107—"Beautiful 'Cause an ugly boy fights and is always grouchy, wants to do this and that. He wants you to give him something."

These answers illustrate the encroachment of moral ideas on the concept of beauty. The ugly child is difficult to get along with, he fights, he takes things away, he doesn't play nicely, he is unfair. By implication, the beautiful boy possesses all the socially accepted virtues

However, a group of seven children were found who fairly clearly disentangle the two themes of beauty and goodness:

> *E P. white,* 12-0, *IQ* 101—"I don't know, just how they act."
>
> *J B white,* 12-0, *IQ* 101—"What I feel is his conduct. You can't tell by how he looks See how he acts"
>
> *H J negro,* 11-1, *IQ* 92—"Play with both of them. A lot of guys I play with are ugly." (I suppose you choose) "Good looking boy. I don't know" (becomes very hesitant—is a beautiful boy better?) "Might not be a better boy, might be bad and an ugly boy good"

> *F R. white,* 11-1, *IQ* 91—"It doesn't matter how beautiful she is, it matters how kind she is and how she plays"
>
> *W L white,* 10-4, *IQ* 113—"It makes no difference whether they're beautiful or ugly as long as you're friends. Play with either or both at the same time"
>
> *N H. white,* 10-3, *IQ* 115—"It all depends if he's my type The beautiful boy looks good to me—I'll play with him—if he's my kind If the ugly boy looks like my kind I'll play with him"
>
> *W S negro,* 12-0, *IQ* 100—"I play with anyone as long as he play right."

The average age and intelligence quotient of this group of patients is 11.4 years and 102.7. Both of these figures are considerably above the average age and intelligence quotient of the whole group and suggest that the crystallizing out of esthetic concepts depends, in part, on maturational factors.

Astonishing is the fact that there were four children who emphasized their preference for ugly children as playmates. Their responses follow:

> *V.C negro,* 11-0, *IQ* 98—"Ugly" (why?) "They're all right. They're nice to you" (Better to you than a beautiful boy?) "Uh, huh, beautiful boy is always bragging"
>
> *J L. white,* 9-6, *IQ* 106—"Rather play with a poor boy. Rich people go to shows A poor guy'll keep a date."
>
> *M O.,* 11-10, *IQ* 74—"An ugly girl" (why?) "Because ugly girl, she might not have anybody else to play with Anyway I like ugly girls They have to do everything. They're for the sisters If they have a sister they have to do the work for the sister."
>
> *N.T.H. white,* 10-0, *IQ* 110—"An ugly boy" (why?) "'Cause an ugly boy hasn't any friends to play with They all make fun of him. A good looking boy has lots of friends I'll be his only friend. Me and him'll be pals together. We'll both like each other and make the rich boy, a good looking boy mad. That's all."

Two of the children used the term "rich" and "beautiful" as synonymous. Two pointed out that they might not have anyone to play with. Another one that "a poor guy'll keep a date" and another that a "beautiful boy is always bragging." Thus all four, in an inverted way, believe that beauty is identical with social acceptance and social success. This conclusion is obviously the same one that those children reached who preferred beautiful children as playmates, but the distinction with this group must be in the social position that these children ascribe to themselves and the rôle in society they think they play. The latter group of children apparently considered themselves outcasts and, making a virtue of a necessity, attempted to attain some mild form of social security and of acceptance by selecting ugly children whom no one else would want as playmates. The response to the question "whom would you rather play with—a beautiful boy or an ugly boy" appears to indicate a certain level of maturation.

4. *Specific Personality Problems and Beauty*

Of especial interest are those cases which present surprising deviations and where one can trace the impact of specific personality traits on esthetic concepts.

> *N H white*, 10-3, *IQ* 115—The patient was extremely dependent on his mother. Both parents were preoccupied with matters of health Recently the child's attendance at school had been irregular and he had had difficulty with his school work His responses follow: "Beautiful I'd make her look smart, make her be smart, make her healthy That's all I can think of." (suppose you had magic and could make your best friend, how would you make him look?) "She friend—she'd look just like my mother, be just like my mother, do everything just like my mother" (suppose you had magic and could make your worst enemy, how would you make him look?) "Make him sick, ugly, so ugly nobody would like to stay near him. Dumb, that's all."
>
> For contrast the description of his mother follows: "She looks good. Got a round face, small chin, small ears, I mean big ears, not as big as mine Her nose would be as big as yours, has a nice little bump on it, light eyebrows, blue eyes, black hair, nice mouth, that's all"

This description of his mother, when contrasted with the average description of the group is startlingly rich in detailed feature itemization. He mentions nine features whereas the average number for the group description of the mother is two Despite the perceptual material which he possesses, it is ignored completely in his description of a beautiful woman for two elements that, for him, are loaded with emotional significance: health and intelligence Thus his description of beauty contains no concrete features but expresses, quite obviously, material more significant to him His choice of a girl as a friend, instead of a boy, is of great interest since this choice was exceptional for our group.

Not only preoccupation with matters of health may lead to the ready disregard of perceptual items but any emotional bent will do so

> *F.R white*, 11-1, *IQ* 91—(suppose you had magic and could make the best friend you would like to have—how would you make her look?) "Kind, that's all" (whom would you rather play with—a beautiful girl or an ugly girl?) "It doesn't matter how beautiful she is, it *matters* how kind she is and how she plays" (how would the face of your best friend look?) "Always smiling" (eyes?) "Any color" (hair?) "Any

> color" (would you want to make her look any particular way) "No It wouldn't make any difference" (why not?) "'Cause the looks don't matter. Only the kindness matters"

The parents of this child were threatening and nagging. She had developed compulsions and had become obsessionally doubtful about every act. In the hospital she was timid, prim, over-conscientious and over-sensitive. Her emotional difficulties transformed the body image from an esthetic one into one that is kindly, warm, smiling, and non-perceptual

6 *Universality of Beauty*

Unfortunately no specific questions were formulated to elicit information on the above topic but, during the investigation, it became evident that the children casually endowed themselves and those whom they liked with beauty. Apparently the idea of beauty as a rare attribute possessed by only a few individuals was totally foreign to them

C. DISCUSSION

This concluding section proposes to formulate the child's esthetic concept as revealed by this investigation, to describe those characteristics in which it differs from the adult's, and to suggest the possibility of future research

The structurelessness of the child's concept of beauty impresses us as the outstanding characteristic revealed by an examination of our material Features, color, shape, are nearly always absent.

It is true that two structural elements are included with low frequency. These are clothes and hair (were it not for these two elements the child's concept would be completely unstructured) But in a previous section we have shown that these two elements are not primarily used in a way that emphasizes design, rather, the child repeatedly stresses their quantity as their impressive aspect

The following question then presents itself · *is the unstructured quality of the child's esthetic concept a direct consequence of imperfect perception of the body?* Although this possibility cannot be excluded, some of our material suggests its implausibility. The section, *Beauty and Specific Personality Problems,* describes the esthetic concept of a boy who gives a rich and highly specific description of his mother's appearance. However, his imagined and ideal esthetic concept contains none of these perceptual elements These latter are disregarded Instead, elements derived from his concern over health and scholarship are utilized

Our investigation of the child's concept of ugliness also tends to exclude this possibility. The section on *Features in Beauty and Ugliness* contains richly descriptive accounts of ugly people with vivid references to pointed, disproportionate and asymmetrical features. Perceptions of the body are evidently utilized for the concept of ugliness but not for the concept of beauty.

Thus, immaturity of perception or lack of availability of perception do not appear to account for the child's unstructured concept of beauty. Therefore, it appears necessary to seek an explanation for this type of unstructured esthetic response in a field outside that of perception.

Before we come to that, it will be useful however to summarize the rôle of perception in relation to the concept of beauty as we have found it in this investigation. When the child's responses are examined broadly and as a whole we come to the following tentative conclusion: the concept of beauty contains in some way a response to the perception of comfort, wealth, prestige, and safety. The frequent references to profusion of clothes, to material possessions, to moral qualities, mentioned in previous sections appear to confirm this formulation.

The child's concept of ugliness gives us a clue to an understanding of the unstructured concept of beauty The child gives richly specific descriptions of ugly features and he gives them spontaneously. The long, sharp, and ugly finger nail embodying content, form and esthetic significance in so condensed a way is the best example of the child's concept of ugliness. The child, however, never gives a similar spontaneous description of a beautiful feature. It is thought of in negative terms: beautiful features do not suggest aggression· i.e., beautiful features are not ugly ones. Ugly ones typify aggression.

It is obvious that no taboo prohibits the child from expressing his condemnation of the long and threatening finger nail But the esthetic response of the child to those structured aspects of the body which are non-aggressive (pleasure-giving?) might involve unconscious and perhaps conscious conflicts. Such a response would tend to be repressed and might not be elicited by our present method.

We know that, in contrast to the unstructured responses of the children we studied, maturer concepts do contain references to structure, design, and color. It thus becomes of value to inquire how the transition from the early unstructured concept to the later, structured concept occurs. Do, for example, sexual taboos become less severe so that form responses to the non-aggressive aspects of the body become permissible? Do unknown maturational factors come into play (in preadolescence and adolescence) and work over (desexualize? sublimate?) structural responses so that they become tolerated and may be consciously verbalized? (Hartmann, 4).

A further difference from the adult is seen in the following: beauty and ugliness are not used by the child as conceptual contraries such as tall and short, fat and thin, wealthy and poor. For the child the ugly person is not the opposite of the beautiful person. He appears to use the terms in a universal and dichotomizing fashion: all people appear to be beautiful except a minority of unpleasant people who are ugly. Beautiful—not beautiful—are applied to the world in one sense, and ugly—not ugly—in another. Thus there are two areas of reference that do not coincide. Beautiful people are those who possess clothes, wealth, prestige, not-beautiful, those who do not. Ugly people are dangerous, not-ugly, the rest of the universe. It appears likely that his dichotomous use of the esthetic concept is a result of the egocentricity of the child between the ages of 5 and 12. Piaget (9) has described the need of the child to view the universe solely from the point of view of how it affects him and not how it actually and objectively is Such a point of view would tend to produce this dichotomous use of esthetic concepts

Still another feature which differentiates the child's esthetic concept from that of the adult is the fact that it contains ethical attributes. The beautiful person, we have noted, is the good person, the ugly person is bad. This characteristic appears to fall under Piaget's distinguishing characteristic of the global, syncretistic thinking of the child The child forms a total concept which expresses the tendency that certain qualities or things "go together," or "belong together," such as beauty and goodness. The result of such an intellectual tendency is that a concept becomes a collection of qualities that "belong together" but which are not integrated into a unified whole in which the subordinate parts are inherently and necessarily articulated This looseness obviously fits the child's concept of beauty, the beautiful person is good, rich, strong, healthy, has a car, can sing, dance, etc. It is also responsible for the impression that the child gives that beauty can be put on and taken off, that it is not an intrinsic part of the body (see section on the envelope of the body)

Our investigation showed that the esthetic concept becomes purified of ethical concepts toward the age of 11-12. This age also coincides with the age level at which Piaget found a decline in syncretistic thinking. It suggests that, as yet unknown maturational forces, find expression at this time in the integration of the concept of beauty An understanding of the development of these maturational forces, and of their relationship to the development of the instincts at this period would give us an increased insight into the development of the esthetic concept.

D. SUMMARY

1. The number of specific, esthetic elements (such as features, clothes, color, proportion) expressed by the child in his concept of beauty is astonishingly small. Even in lengthy descriptions the approximate frequency of such items is only two Most of the responses are referable to non-esthetic categories. These may be material possessions, moral virtues, good health, etc.

2. The esthetic elements that are mentioned with some degree of frequency are clothes, hair and eyes; clothes are mentioned nearly twice as frequently as eyes. Other elements such as ears, nose, mouth, hands, and trunk are hardly ever mentioned It is the profusion of clothes, rather than a particular design or pattern, that is emphasized by the children.

3. When features other than eyes are mentioned, they are described from the viewpoint of their suitability for aggressive purposes.

4 In some children specific personality problems find expression in their esthetic concept.

5. The child views beauty as a widely distributed trait, not as one found in a minority of people

6 The child does not use the terms beauty and ugliness as conceptual contraries but as dichotomous terms. This use may be related to his "egocentrism"

7 The child's concept is diffuse, it includes many non-esthetic elements. The diffuseness of the child's concept of beauty is related to his "syncretistic thinking"

8 The possibility is suggested that the purification of the esthetic concept of non-esthetic elements and the emergence of non-aggressive form responses may be a result of the operation of unknown maturational factors in pre-adolescence and adolescence.

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CRITICAL PERIODS AFFECTING THE DEVELOPMENT OF NORMAL AND MAL-ADJUSTIVE SOCIAL BEHAVIOR OF PUPPIES*

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A. Introduction

In 1945 the Roscoe B. Jackson Memorial Laboratory began an extensive program of research designed to test the relationship between heredity and social behavior, particularly in dogs. One of the important aspects of this work was the opportunity to study the interaction of environmental and hereditary factors in producing so-called "abnormal" behavior.

As necessary groundwork to the total program two things were done: (*a*) A descriptive and experimental study of the development of behavior was made under standard and as nearly optimal conditions as possible, out of which has come the conclusion that there are certain natural periods in development during which the puppy is unusually susceptible to environmental influences. It is with this study that the present paper is concerned. (*b*) Dogs have been studied under more or less free and natural conditions (30), from which it was possible to conclude that the behavior patterns exhibited by dogs toward human beings are essentially the same as those exhibited toward dogs, and that one sort of social relationship which can be set up between men and dogs is essentially similar to the parent-offspring relationship in either species.

Taken together, these two findings should form a firm foundation for experimental studies on the genesis of maladjustive behavior in dogs, the way toward which has already been pointed out by Levy's studies on sucking behavior (12).

If correct, these findings should be consistent with certain aspects of learning theory. In considering the effect of time in relation to the commonly accepted theory that the past experience of an animal determines in part his present behavior, it is possible to make three alternate assumptions: (*a*) that the same experience at any time of life will have the same effect, (*b*) that the same experience will have a greater effect early in development and in proportion to the youth of the subject, and (*c*) that there are certain critical periods in development (some of which may occur early in life), during which the same experience may have a much more profound effect than at other times.

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The first of these assumptions is too naive in view of certain well-established principles of learning. What has been loosely called learning can be situationally divided up into at least three categories (7). All behavior may be thought of as a process of solving problems of greater or lesser difficulty. The difficulties may lie in the sensory cues (as in problems of perception), or in carrying out an obvious solution (as in problems of acquiring skills). If both sorts of difficulties are reduced nearly to zero, there remains a very simple sort of learning in which the chief process is the formation of a bond between the situation and the response. This appears in development before the more complex problem solving abilities are present and therefore is very important in young animals It was extensively studied by Pavlov (22) in conditioned reflexes, and Woodworth (34) has pointed out that studies of simple verbal memory give much the same results.

Both *CR* and verbal memory experiments stress the importance of primacy and recency A *CR* may be extinguished by later training, but still show spontaneous recovery. The earliest and the latest training in any situation are more important than intermediate training, and this simply will not fit the first assumption that the same experience at different times has equal effects. Nor is the principle of recency consistent with the second assumption that effects of experience are directly proportioned to youth.

On the other hand, learning theory fits very well with the third assumption. The interaction of innate and social factors affecting development of behavior should create new situations which make it possible both for the principle of primacy to operate more than once and to limit its action to a relatively few special periods.

The second assumption, however, may rest on other processes than learning, and has been associated with supposed physiological trauma resulting from experience, assuming that the younger an organism is the more tender it is Such conceptions have been extended by certain writers of the psychoanalytic school even to postulating prenatal experience as the most important psychological event in the life of a human infant. Experiments with genetic physical, and chemical agents on early embryological development show that the resulting injuries are not proportional to time but depend upon the developmental processes going on at any particular time (27). There are critical periods in the development of any organ, which are usually periods of unusually rapid growth

Any hypotheses concerning development which assume processes which either remain uniformly the same or which vary in direct proportion to time are closely related to the hypothesis of preformation of the embryo, long discarded by biologists and more recently abandoned by psychologists (23). This applies equally to hypotheses based on physiological processes and learning theory. Physiological processes do not develop with uniform speed, nor do the fetus and infant have the same mental capacities as an adult

Thus from a theoretical point of view the most probable assumption of those listed above is that of critical periods. From a more inductive standpoint, it may be concluded from the facts of the present study that the development of social behavior in the puppy falls into several natural periods, and that in certain of these the puppy is much more responsive and appears to show more lasting effects from its experiences. It follows that the chance of a so-called "traumatic experience" occurring is greater during certain critical periods than at other times The practical importance of this conclusion as a basis for research is obvious, and some attempt is made in this paper to check it on a comparative basis so that its possible connection with clinical results can be estimated.

B. Methods

The system of rearing (see Table 1) is described here in considerable detail as it is only in this way that any comparison with animals raised elsewhere can safely be made Furthermore, because of the fact that the system is simplified, certain behavior traits are inevitably suppressed or reduced.

The plan of the rearing rooms or nursery is given in Figure 1 Since the temperature in the rooms was always kept at approximately 70° F it was possible to leave the side of the nest box open for observation. Besides the nest box the room includes a bench on which the mother could rest and a feeding platform which helped prevent contamination and wastage of food as well as providing something on which the puppies could climb Otherwise, the only objects in the room were a hanging strap made out of a piece of automobile tire and a similar strap which was left lying in the pen Both of these could be used as play objects by the puppies

Pregnant females were wormed at 5 and 7 weeks of gestation, then bathed

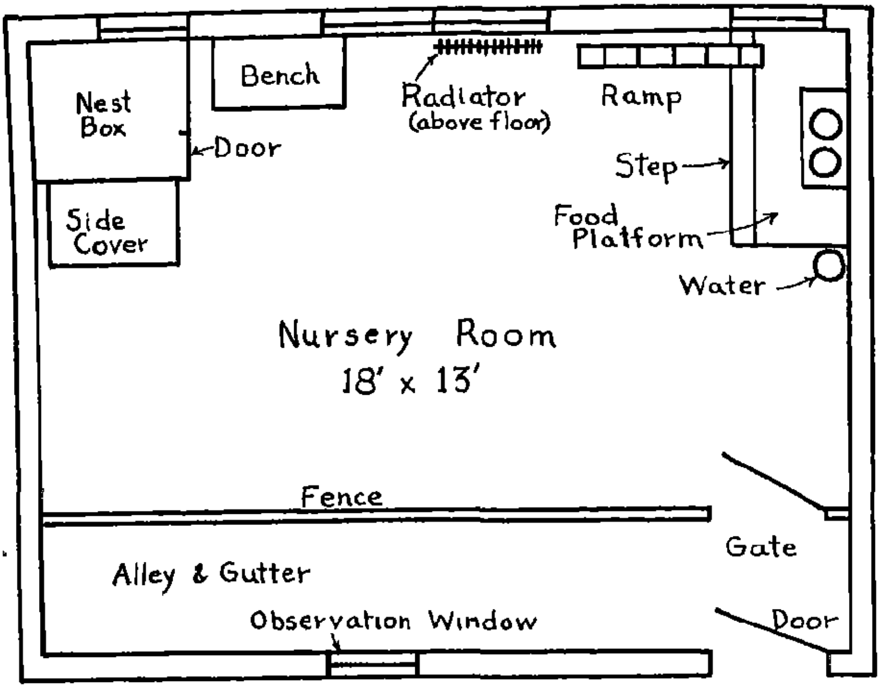

FIGURE 1
FLOOR PLAN FOR ONE OF THE SIX NURSERY ROOMS IN WHICH PUPPIES WERE RAISED FROM BIRTH TO 16 WEEKS OF AGE. CONTENTS DRAWN TO SCALE

and placed in the rearing room as soon as possible After being put in they were given supplementary feedings of milk fortified with vitamin extract such as was given to the pups. All scheduled dates for the care of puppies were based on the date of birth. Gestation in the dog is usually considered to be 9 weeks long, although there is considerable variability.

The two principle threats to the health of young puppies come from ascarid worms and distemper. Since the worms come from the mother, the above mentioned treatments of the mother help a great deal. However, it was found advisable to worm the puppies at 4, 8 and 16 weeks of age, using appropriate doses of N-butyl-chloride. No lasting effects of these treatments were observed, and puppies appeared to be fully recovered on the following day.

With regard to distemper, puppies are considered to be immune until about 8 weeks of age. At 8 and 10 weeks of age puppies were given 10 cc.

TABLE 1
SCHEDULE FOR CARE AND TESTING OF PUPPIES FROM 0-16 WEEKS OF AGE. TESTS DONE AS NEARLY AS POSSIBLE ON EXACT DAY

Week	Feeding	Veterinary care	Cleaning of pens	Relationship tests	Performance tests
0					
1					
2				Group dominance begun	
3	Solid food available				
4	Milk feeding begun	First worming	Steam cleaning		
5				Handling, individual dominance	
6					Barrier test
7				Handling	
8		Second worming, distemper serum	Steam cleaning		
9				Handling	Undetermined test
10	Mother removed	Distemper serum		Group dominance ended	
11				Handling, individual dominance	
12		Distemper vaccine	Steam cleaning		
13				Handling	Maze test
14		Distemper virus			Maze test continued
15				Handling, individual dominance	
16		Third worming	Steam cleaning		

doses of anti-distemper serum At 12 weeks this was followed by an injection of distemper vaccine and at 14 weeks a single injection of distemper virus[2] Aside from the discomfort of the injections no toxic effect has been observed and there have been no cases of distemper in puppies so treated

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[2] Anti-distemper products were furnished through the courtesy of the Lederle Company without whose support such a large scale program of protection would have been impossibe

The schedule of cleaning was coordinated with veterinary care. The floors of the nursery rooms were kept covered with wood shavings, and feces and wet shavings were removed once daily Each room was thoroughly steam cleaned once every four weeks During this time the puppies were removed from the rearing rooms and necessarily subjected to considerable noise and disturbance. As noted above, the puppies when wormed could be put back into clean rooms At the same time, small amounts of *DDT* powder were sprinkled around the room in order to prevent the appearance of fleas.

Purina Laboratory Chow was kept on the food stand at all times. At the age of three weeks a dish of Purina kibbled meal was placed in the nest box so that puppies could take this dry food at any time At four weeks the puppies were started on the same milk mixture as the bitches An attempt was made to keep the intake of milk within the 10 per cent limit advised by McCay, and the amount was gradually increased to approximately ½ pint per pup as they grew older If lactose diarrhea appeared, the amount of milk was cut down After removal from the rearing room at 16 weeks of age, the puppies were fed only on laboratory chow Growth curves indicated that this system of feeding was satisfactory, and most puppies gave every indication of normal health.

Caretakers were instructed not to handle the pups except when necessary and both caretakers and experimenters were instructed not to make special pets of any animals

Daily 10-minute observations were made of each litter of puppies except on Sundays. Preliminary observations by Smith (32) indicated that puppies were inactive during a great part of the day and that most significant observations could be made during the morning hours while the feeding and cleaning was disturbing the puppies Observations were made inside the room until the puppies first began to notice the observer (at about three weeks of age) and were thereafter carried on through an observation window All behavior was recorded and a special attempt was made to look for the *first appearance* of important behavior items and physical changes

More detailed observations were made once per week in connection with weighing the animals. The pulse rate of the puppy was taken as soon as it was picked up It was then weighed (both these measurements give indication as to whether the animal is in good health), and reactions on the scale noted for one minute During early life these reactions are largely symptoms of discomfort, whereas later on they chiefly indicate the reaction of the animal to inhibitory training. After one minute the animal was removed from the scales and the heart rate taken again. During the first four weeks simple tests of the use of the sense organs followed this routine.

A short period test of activity using a spring suspended cage was first included in the period of weekly observations, but since this was time-consuming and indicated no consistent individual differences, it was later given up. Behavior on the scales was recorded and graded on two scales which indicated degrees of activity and degrees of timidity in this situation

An attempt was made to fit specific tests into this rearing program in such a way that they would not be influenced by veterinary treatments and cleaning These tests may be divided into two classes relationship tests and performance tests. The principle relationships concerned are those between litter mates, between mother and offspring, and between puppies and human beings, particularly those persons giving the tests

One of the most important relationships between dogs themselves appeared to be that of dominance, and an attempt was made to test the dominance which appeared as a result of playful fighting, at the same time allowing the test itself to influence the development of dominance as little as possible. Starting at two weeks of age, each litter was given a fresh bone for a period of 15 minutes (later cut to 10) and the resulting behavior recorded At 5, 11, and 15 weeks a similar test was given to each possible pair within the litter in order to determine the dominance rank A similar test was given to the mother and puppies at seven weeks of age. It now appears that a test should be made of epimeletic behavior by the mother in this same relationship, and this will probably be added in the future.

A test of the relationship between the experimenters and the dogs was given regularly at 5, 7, 9, 11, 13, and 15 weeks of age This test consisted of standardized handling procedures similar to those ordinarily used by dog owners.

This schedule allowed the inclusion of three performance tests Although these could not be standardized at first, they were so designed that all puppies would be subjected to approximately the same sort of treatment at corresponding ages. At six weeks of age the puppies were given a test involving barriers in a strange situation The test at nine weeks involved developing and changing a goal-oriented habit in the rearing room. At 13 weeks of age the animals were given a maze test.

It should be pointed out that the above routine is an ideal system and that certain accidental departures were inevitable. However, whenever departures have been made this has been noted down in the behavior record of the individual concerned When two procedures were in conflict, as for example a test and veterinary treatment, the test was always given before the veterinary treatment. Whenever possible, tests were given on the exact day scheduled, but there were, of course, some slight departures from this

TABLE 2
List of Puppies Studied

Breed	No litters	No. individuals
Observational data only used		
Beagle	2	9
Cocker Spaniel	1	3
Scottish Terrier	1	2
Shetland Sheep Dog	1	4
Wire haired Fox Terrier	1	2
Both test and Observational data used		
Basenji	1	8
Beagle	3	12
Cocker Spaniel	2	10
Dachshund	1	5
Shetland Sheep Dog	1	4
Wire-haired Fox Terrier	3	14
Total	17	73

Reference to Table 2 will show that a total of 7 breeds, 17 litters, and 73 individuals have been studied. The first six of these litters have been used for observational studies only as most of the tests were being developed on these litters and the test results are not comparable Considerable variability in development was observed between individuals and between litters, particularly in the time of appearance of certain traits. However, the fact that an animal is not observed to perform a certain act does not mean that he is incapable of this act, and the present paper attempts to describe a pattern of development which appears to be common to all dogs.

The development of the puppies has been classified into various periods based on definite and important changes of behavior which in most cases coincide with important changes in social relationships The complete definition of these periods is discussed below in the section on comparative data, and the classification of behavior patterns is essentially the same as that used in earlier papers (28).

C. Development of Social Behavior in Puppies: Description by Periods

1. *Period I, Neonatal: From Birth Until Eyes Open*

a. Sense organs. The newborn puppies predominantly employ the thermal and tactile senses, reacting principally to cold and touch. Smell and taste are probably also present, since most puppies will taste fish if offered to them and react negatively to strong smelling substances such as oil of anise.

However, these senses are little used because the puppy takes in no food except milk and has little use for smelling objects Puppies placed a few inches away from their mothers apparently did not detect her presence by smell, showing no unusual actions or orientation. Since the eyes are closed, sight, of course, is not used The external auditory meatus is closed, and we have no evidence that hearing is present. Puppies do not react in any way to loud sounds or to high pitched sounds produced by the Galton whistle The startle reaction is therefore missing, as is any fear response to falling (i.e., when lowered suddenly). On the other hand, they will extend the forelegs and sometimes whine when slipping off the edge of the scales.

b Psychological abilities We have no direct evidence in favor of conditioning, but judging from puppies that have been raised on the bottle, animals of this age gain facility in nursing or become used to rejecting the bottle Animals which are well fed act quite differently from those not receiving an adequate milk supply, but this does not imply learning There is no evidence regarding their ability to solve problems, but because of their limited motor and sensory abilities it would be very difficult to ascertain whether or not this ability was present.

c. Motor abilities. The puppies are able to crawl forward and to right themselves if turned upside down They can lift their heads and move them unsteadily. The wink reflex in response to touch is present in some animals even though the eyes are closed While sleeping the puppies show typical twitching reactions of the limbs Periods of activity while eating are interspersed with long periods of quiet in which the animals may be presumed to be asleep.

d Social behavior

(1). *Ingestive behavior.* The newborn puppies in contact with the mother's breast suck at various points until they reach a nipple As soon as feeding begins they push against the breast with the head, alternately push with the fore paws and hold themselves against it by pushing with the hind legs The tail is held down and slightly out from the perineal region. This tail posture is typical also of adult dogs while feeding

(2). *Eliminative behavior* While feeding the puppies, the mother noses and licks the under side of the puppies, removing feces and urine This apparently sets off appropriate reflexes in the young puppies These same reflexes may occasionally be called forth by the handling of an experimenter.

(3). *Investigative behavior.* When cold or hungry the puppies typically crawl forward swinging the head from one side to another and stopping when the head touches some warm smooth surface such as provided by the mother or other puppies Another investigative pattern which appears very early is that of sniffing

(4) *Et-epimeletic behavior* This has been previously defined as calling or signalling for care or attention (28). In connection with investigation, which is usually stimulated by discomfort of some kind, the puppies frequently whine, a reaction which often has the effect of attracting the attention of the mother. Increasing amounts of discomfort may cause these whines to increase in loudness to yelps There is very seldom any other type of vocalization in puppies during the neonatal period.

(5) *Contactual behavior* When the pupies are cold or wet they tend to crowd close to the mother or to pile themselves closely together if she is absent

(6). *Agonistic or conflict behavior* This is limited to escape behavior and yelping in reaction to pain. There is no allelomimetic behavior except that several puppies may react to the same stimulus at the same time, as when the mother offers to nurse. There is no recognizable sexual behavior, aggressive fighting, or epimeletic behavior

In general, the stimuli responded to appear to be cold and pain externally and hunger internally Behavior of the "emotional" sort is largely confined to the whining or et-epimeletic behavior described above. Neonatal puppies show signs of discomfort and satiation, but nothing that could be called fear

All evidence seems to indicate that there is little development during this period except in growth and strength and that all of the above patterns of behavior are present both at birth and at the end of the period. Smith (32) found that there is a much higher correlation between genetically different litters of puppies during this period than in later periods.

Just as thermal and tactile reactions dominate in the sensory field, it may be said that et-epimeletic behavior is predominate in the social field, exclusive of ingestive and eliminative behavior which are essential to life. All types of social behavior present at this time will be profoundly modified later.

2. *Period II, Transition. From the Opening of the Eyes Until Leaving the Nest*

This is a fairly short period in which rapid changes take place in sensory and motor capacities. The period generally lasts from 10 days to two weeks, usually ending while the animal is between three and four weeks of age.

a. Sense organs The time of the opening of the eyes is quite variable and has been recorded as occurring as early as 11 days and as late as 19. Since the gestation period is variable this probably reflects the fact that puppies may be born more or less immaturely, as well as exhibiting genetic differences in rates of development The eyes are apparently used at once, as the puppies tend to crawl backwards as soon as they are open However, it is probable that the puppies have to learn to use their eyes as has been reported in chimpanzees (25), since the wink reflex can be elicited by touch and not by moving objects and apparently has to be conditioned

The pupillary reflex is present as soon as the eyes are open, as is nystagmus, although some individuals show at first simple rolling motion instead of quick jerks.

The first definite auditory reaction, the startle reflex to loud noises, has never been observed earlier than three weeks of age This reaction usually consists of withdrawal and flattening of the body, although some animals merely erect the ears

By the end of the period all sense organs are obviously functional, and tactile and thermal reactions are no longer dominant, their place being taken by responses given to visual, auditory, and olfactory stimuli.

b Psychological abilities There is no further evidence regarding conditioning. The same applies to the puppy's ability to solve problems, and until the end of this period the puppy is incapable of doing enough things so that satisfactory tests of this sort can be applied.

c. Motor abilities. Most puppies begin to walk in an unsteady fashion at about 18 days of age, although some have been recorded as early as 12 days Along with this, the animal stands erect and crawling disappears The puppies are more active and spend less time sleeping They also begin to chew on each other, an action which seems to be correlated with the eruption of the teeth, beginning with canines and incisors.

d. Social Behavior.

(1) *Ingestive behavior* Nursing is continued, but toward the end of this period the mother may nurse the puppies in a sitting position instead of lying down, and the periods of nursing appear to be shorter. Solid food is first taken at about three weeks of age, at approximately the same time as the teeth erupt However, the teeth still cannot be used for masticating the food.

(2) *Eliminative behavior* During this period the puppies begin to eliminate independently of the mother's actions, leaving the sleeping corner to do so, and at the end of the period regularly eliminate outside of the nest

(3). *Investigative behavior* The neonatal pattern of swinging the head from side to side disappears and investigation is apparently accomplished with eyes, nose, and ears. No definite adult patterns of investigation have appeared as yet. Movements are definitely oriented toward distant objects.

(4) *Et-epimeletic behavior* The early pattern of whining is continued but is much less frequent. The tail wagging pattern of behavior does not appear yet

(5). *Contactual behavior.* The puppies continue to crowd together when sleeping but apparently are much less sensitive to cold than in the early period

(6) *Agonistic behavior.* Fighting play (the first aggressive form of conflict behavior) first appears near the end of this period and includes clumsy pawing and biting of the litter mates or portions of the mother's body. Growling is occasionally present but not barking. As noted above, the startle reaction is given to loud noises such as the growling of the mother, but not earlier than about three weeks.

There is still no allelomimetic, sexual, or epimeletic behavior present, and most of the neonatal patterns of behavior are still present, although in a weaker form The period is primarily one of change in physiological capacities, both sensory and motor, which are reflected in changes in social behavior during the next period. At the end of this period, the puppy gives its first reactions which indicate a differentiation of social environment; e.g, it first pays attention to an observer It also gives the first behavior and attitudes which indicate timidity or fear responses. The end of the period is also the time when the puppy begins to frequently leave the comparatively sheltered and uniform environment of the nest.

3. *Period III, Socialization or Social Adjustment, Leaving Nest Until weaning (The Period May Also be Said to Begin When the Puppies First Notice the Observer)*

During this period the puppies first come into extensive contact with people and animals other than the mother and litter mates, and they explore the immediate environment of the nest. Under the conditions of rearing, this means that they come into contact with feeders and experimenters, and explore the entire nursery room. By the end of the period they have developed, at least in playful form, all of the main types of social behavior but epimeletic. The puppies make considerable progress in physical development, but even at the end of the period are still comparatively slow, helpless, and dependent compared to adults.

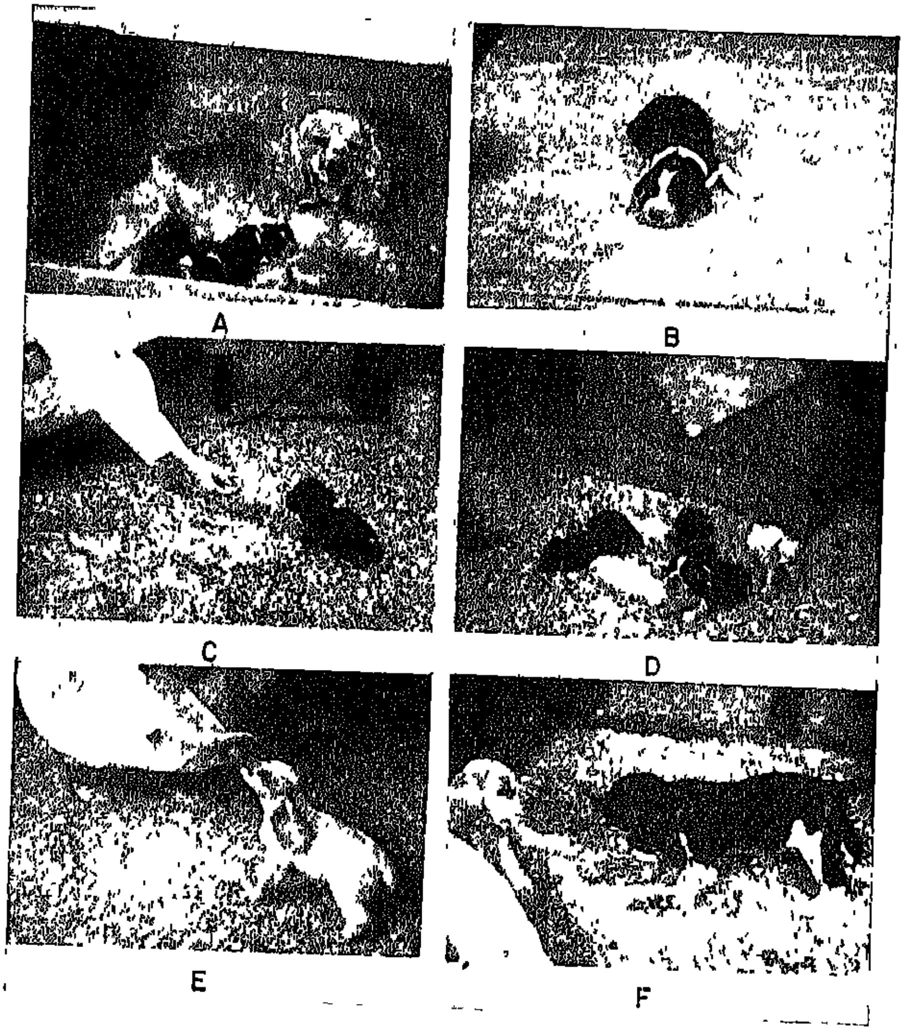

FIGURE 2

Cocker Spaniel Puppies in Three Stages of Development (Photographs Enlarged from 16 mm. Motion Picture Frames)

A Neonatal stage, nursing *B* Neonatal Stage, investigative behavior The puppy crawls, swinging the head from side to side. *C* Early Socialization Stage (27 days), reaction to handling Note posture of withdrawal, and compare with *E* below *D*. Same stage, startle reaction to sound of metal sheet struck against box *E* Early Juvenile stage, reaction to handling The puppy approaches with wagging tail and attempts to lick the hand *F* Same stage, conflict behavior in presence of a bone The puppy on the right succeeded in dominating the others in the litter, and barks at the more subordinate animal on the left.

a. Sense organs All the sense organs appear to be functional, and the puppies apparently learn to recognize and differentiate objects. At first the puppies are very sensitive to sudden movements or loud noises, crouching down in reaction to them By six weeks of age they apparently try to follow scent trails, and new objects are investigated with nose, eyes, and mouth.

b. Psychological abilities Puppies can solve simple problems, such as the way around barriers, as early as six weeks The stages usually include investigation, failure followed by random movements and whining, further investigation and solution There is some evidence that puppies are able to 'generalize from one situation to another, and definite evidence of conditioning. By nine weeks puppies remember a feeding place after one trial

c Motor abilities Puppies learn to run, although in a relatively awkward fashion, and the amount of chewing gradually increases so that coarser food can be utilized.

d. Social behavior

(1) *Ingestive behavior.* Nursing is continued but it is less frequent and takes a shorter time. The mother often stands while allowing the pups to nurse. At the end of the period this pattern is, of course, discontinued. Throughout this period the pups drink water and milk, take solid food, and chew it more extensively.[3]

(2) *Eliminative behavior* In this period (at 8½ weeks, according to Ross (26)), the puppies begin to defecate in a definite place, usually at a distance from both the sleeping place and the food. This habit is common to both dogs and wolves. Along with this behavior the pups show interest in feces.

(3). *Investigative behavior.* By six weeks of age the puppies make definite attempts at trailing, and the general adult patterns of investigation are established, although not necessarily in the adult form typical of the breed.

(4) *Et-epimeletic behavior* The puppies are still dependent and whine and yelp if frustrated in any way, whether by barriers, lack of food, etc. Added to the vocalization, a new pattern of behavior appears under this category The pup approaches another dog or a human being with wagging tail and will lick the face and gently paw the other animal. This reaction occurs more often if the pup is hungry or if the other animal has recently

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[3] According to Martins (16), three mothers fed at a distance from the pups began disgorging behavior at the beginning of Period III (22-24 days), the pups feeding from the vomited material. This reaction occurs regularly in wolves (35) However, under our conditions of feeding disgorging behavior occurred regularly in only one female, a basenji

been eating, and is probably primitively a food begging reaction. This pattern appears early in the period and increases as the period goes on.

(5) *Contactual behavior* Under the nursery conditions the puppies are often seen sleeping apart, although they may crowd together if the temperature happens to fall.

(6) *Agonistic behavior* There is a gradually increasing amount of playful fighting The puppies throw themselves on each other, pawing, growling and chewing each other's ears A puppy which is underneath may roll over on its back and extend the paws (pattern of extreme subordination in playful form). Dominance in fighting gradually develops but no marked dominance postures are present until the end of the period The puppies begin to bark early in the period and this becomes gradually more frequent In the latter half of the period it is frequent for two or three puppies to surround and playfully attack one individual This pattern is usually evoked by a scuffle between a pair of animals One of them runs away and the rest follow and attack Toward the end of the period a playful fight may occasionally become more serious, marked by louder growling and harder biting. This usually ends quickly, with the losing pup assuming a subordinate attitude

(7). *Allelomimetic behavior* The first evidences of coordinated group activity are seen in the group attacks referred to above (first observed about 6½ weeks) and in the tendency of puppies to rush together to the door of the pen when it is entered

(8). *Sexual behavior* No complete sexual behavior is present but puppies may show the "playful" attitude characteristic of courtship, and mount and clasp each other during their play This behavior may be seen rather early in the period and becomes gradually more common, apparently as the testes descend in the male This behavior is always interrupted if an observer is noticed, in contrast to adult sexual behavior

By the end of this period the neonatal patterns of behavior have almost disappeared and all the main adult types of behavior are present, at least in playful form. From now on development is largely a matter of growth and learning of skills with but few sudden changes in behavior. By the end of this period most basic social relationships have been established

4 *Period IV, Juvenile Weaning Until Sexual Maturity (Studied in Detail to 16 Weeks)*

The time at which the puppies are shifted outside the nursery environment was arbitrarily chosen as one at which the puppies could take care of them-

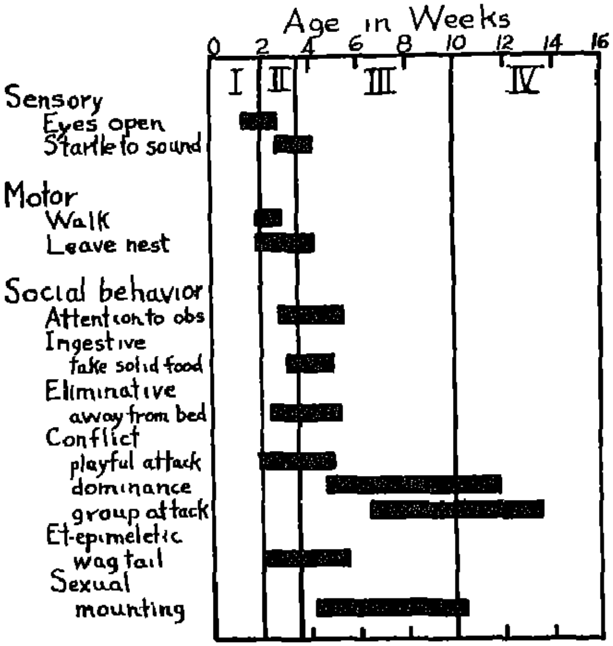

FIGURE 3

RANGE OF VARIABILITY OF TIME AT WHICH CERTAIN SIGNIFICANT DEVELOPMENTAL EVENTS WERE FIRST OBSERVED IN A LITTER NOTE RELATIONSHIP TO THE STAGES OF DEVELOPMENT.

selves in the more rigorous outdoor environment However, this choice had a slight natural basis, as four months is approximately the time that the second set of teeth appear Thus there is some justification for making a minor division of the period. The length of this period varies considerably The earliest date of fertile sexual behavior observed at this laboratory has been six months (both male and female), but many animals do not mature until well over a year.

a. *Sense organs.* No change.

b. *Psychological abilities* In problem solving it appears that the puppies are still handicapped by inability to inhibit themselves and give a long attention span, but it is apparent that this ability develops gradually throughout the whole period. Puppies tested on a maze with a pattern consisting of one right, two left, and three right turns have so far never shown perfect scores after 10 trials at 13 weeks

c. *Motor abilities.* At the beginning of the period the puppies are comparatively slow and awkward but by the time of sexual maturity are almost as capable as adults Dogs are usually considered to reach maximum physical development at about two years of age.

d. Social behavior.

(1). *Ingestive* The adult pattern of eating and drinking is present during all this period There is no opportunity for adult dogs to feed the juvenile animals, although this might take place under other conditions

(2) *Eliminative behavior* According to Martins (15), the adult pattern of leg lifting in the males is developed at 5-8 months Likewise, scratching after defecation appears during this period The tendency to urinate at "scent posts" appears along with this pattern

However, under our conditions these patterns are rarely seen unless strange animals are admitted to the pens

(3). *Investigative behavior.* By the beginning of this period the puppies are alert to noises outside their own room and differentiate between stimuli having some significance and those which do not

(4). *Et-epimeletic behavior.* The food begging reaction described above is still very prominent during this period and probably increases at least up to 16 weeks

(5). *Contactual behavior.* No change.

(6). *Agonistic behavior* By 15 weeks of age the playful fighting has been pretty well organized into a dominance system and there is, therefore, less actual bodily contact By the end of Period IV the definite bodily postures of dominance (tail erect, growling, and placing fore feet on the other animal), and subordination (crouching with tail between legs or rolling on back with paws outstretched) have been developed Severe fighting in which the animals actually hurt each other has been observed in only 2 out of 17 litters (both Foxterriers)

(7). *Allelomimetic behavior.* The litter tends to react more and more as a unit to any stimulation. If one animal is attracted by a noise or a movement and runs to investigate, the rest usually follow.

(8). *Sexual behavior.* The playful patterns described under the preceding period are continued but are not frequently seen unless the pups are unaware of the observer. Marking the end of the period, of course, are the first estrus periods of the females and the appearance of adult sexual patterns in both sexes.

In summary, this period is primarily one of growth and the development of skill in motor patterns already present in other periods In free living animals this is the period which would be spent in learning to hunt and become self supporting.

Other periods, with which this paper is not concerned, are the adult reproductive period and the period of old age.

D. DEVELOPMENT OF SOCIAL BEHAVIOR IN PUPPIES: CHANGES IN OBJECTIVE TESTS

The above general description of behavior can be supplemented by a briefer description of test results which extend over more than one period of development and so give an index of the validity of the periods (see Figure 3).

1. *Body Weight*

The puppies were weighed once a week in a routine manner, and the gains in weight reflect differences in nutrition, differences in health (although any puppies which were observedly sick have been removed from this analysis), and routine differences in growth rate. Referring to the figure in which the average gains in weight are plotted, it will be seen that up to two weeks of age there is a relatively uniform growth rate, followed by a slight fall in the third week At this point, extra food is made available, which is reflected in a steady rise in the curve up to the 8th week The fall in the following week reflects the fact that certain mothers wean their puppies about this time, and a similar drop at the 11th week reflects the fact that all mothers have been removed. The gains then remain at approximately the same level until the 15th week when there is a decline, which probably indicates either teething difficulties or that certain animals are beginning to have a levelling off period in growth. Another possibility might be aftereffects of distemper innoculation at 14 weeks, but no other symptoms have been seen

Although these changes reflect changes in the source of nutrition, the fact that they also occur at the dividing points between the periods objectively confirms the reality of these periods

2 *Changes in Heart Rate*

As pointed out in the introduction, the heart rate is taken before and after the weekly weighing. This experience is quite a different one for puppies in the different periods. In Stages I and II the puppies are usually asleep or nursing before being picked up, and they often seem to go to sleep in the hand. Being placed on the cold surface of the metal scale appears to be exciting and disturbing to them On the other hand, puppies in the later periods may be running around excitedly before being picked up, and since they stand on the scales, the situation is not uncomfortable. Their move

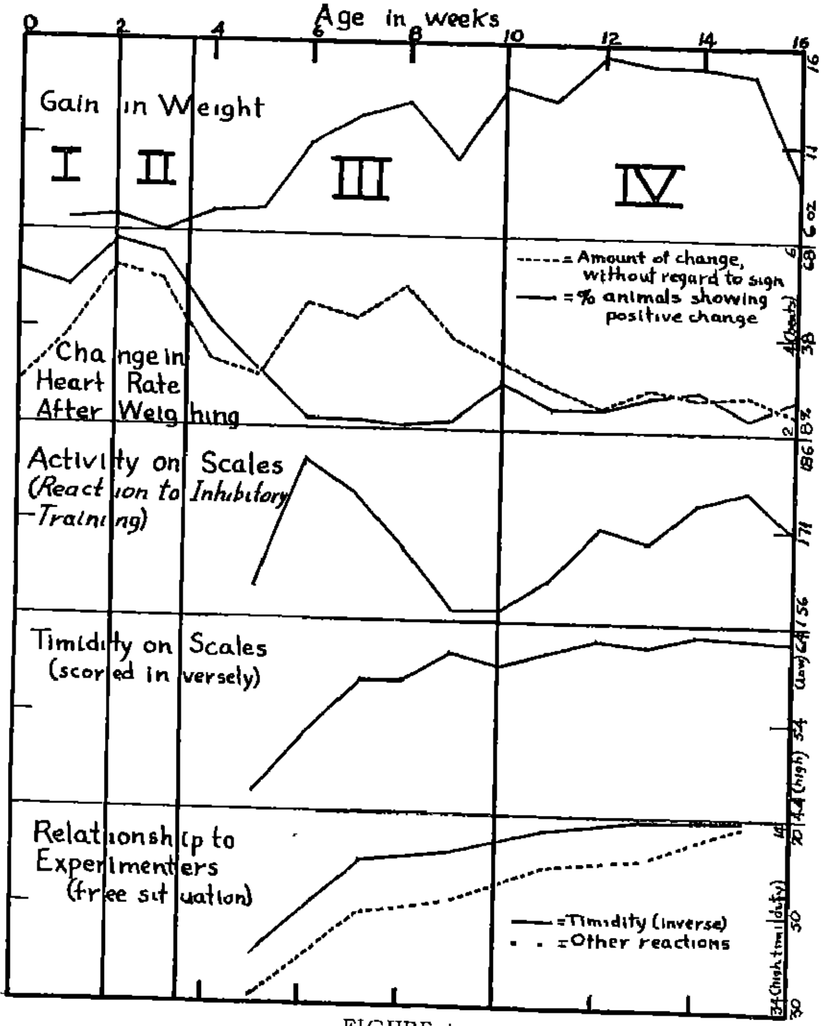

FIGURE 1
AVERAGE CHANGES IN VARIOUS BEHAVIOR INDICES IN RELATION TO PERIODS OF DEVELOPMENT (SCALES ADJUSTED TO MAKE MAXIMUM RANGES OF VARIABILITY APPROXIMATELY EQUAL)

ments are mildly restrained in order to facilitate weighing, and this results in their being given training in standing still under this situation

In the figure the heart rate change without regard to sign shows two peaks, at two weeks and approximately 6-8 weeks, with a valley at 4-5 weeks. After the second peak the curve falls off rapidly and reaches a plateau at about 12 weeks This can be interpreted by reference to the other curve of the per cent of animals showing increases in heart rate at any one age, which shows a peak at two weeks and falls off rapidly to a plateau from 6 to 9 weeks, then rising to a slightly higher level during Period IV.

During Period I the rise in heart rate for most animals probably represents a reaction to discomfort By Period III the usual reaction is one of timidity and inhibition with a characteristic decrease in heart rate. As the animals become accustomed to the situation, there is less change in rate.

In this measure of change in heart rate there is again objective confirmation of the reality of the different periods of development, the principal changes coming near the beginning and end of Period III

3. *Activity Ratings*

As indicated above, placing the puppy on the scales amounts to giving him mild training to stand still. Up to the age of four weeks of age all the puppies are likely to be rated as active on the scales, and since it is difficult to compare crawling activity and walking activity, the former has been omitted. The graph shows peaks of activity in Periods III and IV with evidence of valleys at 5 and 9-10 weeks. This curve, incidentally, may be partly related to the heart rate curves Activity is one measure which seems to show breed differences, and the rise in Period IV is probably the result of certain individuals whose activity increases, rather than that of the whole population.

4. *Confidence-Timidity Rating*

While being weighed, the body and tail posture of the pups is recorded and this is afterwards converted into a score where a low figure indicates timidity and a high figure the lack of it. This rating cannot be accurately done before five weeks. As inversely plotted in the graph, the average confidence-timidity rating takes the general form of a learning curve, with a rapid rise from five until seven weeks and a general levelling off thereafter. All of the change in this rating takes place during the period of socialization, and it seems to show considerable resemblance to the curves obtained from the tests of relationships with people discussed below

5. *Dominance*

As described in a previous paper (31), dominance develops in a litter of puppies in connection with playful fighting. At five weeks (in the first part of the period of socialization), 31 per cent of the relationships between puppies can be recognized as dominance, whereas by 11 weeks this percentage has risen to 95 per cent If it were possible to draw a curve for dominance, it would probably very closely follow that for timidity and confidence. However, about one-third of the dominance relationships observed at 11 weeks are changed by 15 weeks, which indicates that strong habits of dominance have not yet been formed. In certain litters where there have been no changes as a result of mating behavior, the dominance order at one year of age has remained the same as at 15 weeks, which indicates that the dominance order may in some cases be fairly well fixed at 15 weeks Most of the change from non-dominance to dominance occurs within the period of socialization, although in some cases the relationship established is not stable

6. *Tests of Relationships with Handlers*

There is not space enough in this paper to describe these results in detail, a task which will be attempted in another publication. However, it is obvious from the graph of the scores, which indicate timidity and other types of reactivity to people, that the biggest changes occur from 5 to 7 weeks during the period of socialization, and that there is a levelling off period later. It may be thought that this change is caused by the fact that the performance tests are first given at six weeks of age and are the first extensive training in handling which the puppy gets In this connection the confidence and timidity ratings are useful, since they also show the same trend from 5 to 6 weeks, before extensive handling is done. In conclusion, this test also tends to confirm the reality of the periods of development which were developed from descriptive data.

E. Discussion and Conclusions. The Hypothesis of Critical Periods

In this paper the viewpoint has been presented that the development of puppies falls into several natural periods, which were first obtained by descriptions of social behavior and then confirmed by objective ratings of behavior traits, as well as by certain physiological and physical measurements. In reviewing these data, it would appear that there are distinct dividing lines between all of the periods except between the neonatal and transition periods The opening of the eyes is a dramatic event but it does not as dramatically change the behavior of the puppies, and in some way it might be better to think of Period II, the transition period, as being the end of the neonatal period or at least very closely allied to it

If this is done, it will be seen that all of the remaining periods are set off by changes in social relationships which naturally occur in the normal development of the puppy This, together with certain observational data, leads to the idea that there are critical periods in development which correspond to the times when new social relations appear.

For example, a puppy at the beginning of the period of socialization is obviously extremely fearful, shrinking away from loud sounds and sudden movements of any kind. In one litter the mother became ill at this time and soon died The puppies were much upset and became unusually attached to the human handlers. On the other hand, there is almost no evidence of disturbance in litters where the mothers are removed at the usual weaning time of 10 weeks

In several litters of puppies, the tails have been removed during the neonatal period, as is usually done for certain breeds of dogs. There has so far been no evidence of gross differences in behavior between these animals and their litter mates. In short, where environmental disturbances have occurred, the evidence does not support the commonly held view that these should be more effective in the earlier stages of development, but rather leads to the hypothesis that disturbances are most important and effective when they occur at periods when new social relationships are being developed. In addition, the newborn animal is far from being sensitive. He appears to be emotionally undeveloped, and from a sensory point of view, protected from the environment, since he can neither see nor hear.

Thus there appear to be two major factors which determine which periods of life will be critical in the development of social behavior. One of these is the time at which any new social adjustment is made, which is almost inevitably important because of the well-known influence of primacy and successful adjustment on learning

The other is the factor of maturation of the nervous system. In the dog, the greatest changes of this sort appear to coincide with the beginning of social adjustments outside the nest, which makes the period of socialization (III) a doubly critical one At this time the puppy first shows something like complete emotional capacities, and simultaneously first becomes aware of potentially dangerous or helpful features of the environment. From the standpoint of learning, the puppy should have no standards of comparison as to what constitutes, for example, a dangerous experience, and no control of emotional reactions should have been built up through conditioning in non-dangerous situations. The puppy therefore over-reacts, giving all indications of extreme fear to loud but harmless noises and sudden but innocuous movements.

Applying these hypotheses, it may be stated that the critical periods of development in the early life of a puppy should be, (*a*) birth, at which the adjustment to nursing is a matter of life or death but not of psychological trauma, (*b*) the early part of Period III when the puppies develop social relationships with dogs outside the litter or with people, and establish new relationships within the litter, and during which the factor of maturation of the nervous system exerts its greatest effect. A third critical period, of course, should be that of sexual maturity, when new relationships with the opposite sex should be established.

These hypotheses have important implications for the study of abnormal behavior and for mental hygiene because from them it may be concluded that so-called "traumatic experiences" should be most effective during certain critical periods, particularly in Period III This statement, of course, needs repeated experimental verification, some of which is being undertaken in this laboratory at the present time. It also implies that those hypotheses may be widely extended, and this possibility may be briefly examined in the light of available comparative evidence

F. COMPARATIVE DATA

1. *Dogs*

A pioneer study on the development of puppies was published by Mills (18) in 1898. He worked chiefly with one litter of St. Bernards, but also raised a litter of Bedlingtons and one mongrel for comparison. He appears to have been an excellent observer, although his interpretation is often more interesting as history rather than science. The best recent studies of the development of behavior in puppies have been done by Baege (1) and the two Menzels (17) The former studied a litter of five puppies which were a cross between an Airdale female and (probably) a male German Shepherd. Menzel's studies on the other hand were done on a large population of purebred Boxers

Baege followed the plan of studying sensory and motor development, as well as what he called emotions The Menzels followed Baege's outline in general, but have added to it a consideration of social behavior and periods of development.

a. Sense organs All authors agree on the general picture of sensory development, that the neonatal puppies respond principally to tactile and thermal stimuli, but are also able to smell and taste The Menzels report that some Boxers gave evidence of hearing as early as 15 days, but that this appeared in most animals around 21 days. Mills reports hearing about the 18th day.

b. Psychological abilities.

No effective tests have been developed which will give a true picture of the psychological development of young puppies. A point of considerable theoretical interest is the question of whether or not puppies can be conditioned in the neonatal stage Baege states that on the 15th day of development a puppy failed to learn not to crawl off the edge of a table. He states that these puppies can only learn by association, but gives no evidence. The Menzels report one case in which a bottle fed puppy 13 days old apparently tried to search for the bottle after failing to find a place at the mother's breast. Mills, like the present authors, could not get the wink reflex to movement in the transition period, and definitely reports it first on the 21st day. Bahrs (2) found changes in two reflexes occurring at the same period, but the alterations appeared to be physiological rather than the effect of learning.

In general, it must be concluded that more critical experiments are needed to determine whether or not the neonatal puppy is affected by experience, as this has considerable importance both with regard to critical periods in development and the possibility of doing experimental work on psychological trauma In any case, the power of learning of these puppies must be extremely limited because of the limitations of sensory and motor capacities.

c Motor abilities. Our work confirms the observations of Baege and Menzel.

d. Social behavior

(1) *Ingestive behavior.* All authors are in general agreement with regard to the development of ingestive behavior Martins (16) has recently described the vomiting behavior of the bitch, which seems to coincide with the taking of solid food by the young

(2). *Eliminative behavior* This has been the subject of considerable special study by Berg (3) and Martins (15) because of its significance in endocrinology In general, all authors agree. Menzel says that the leg lifting of the male has been seen as early as 67 days (9 weeks) but that it tends to disappear and show up again later on at about five months. All authors also agree that the puppies begin early to defecate in a special spot away from the bed However, there is some suggestion by Baege (1) and Ross (26) that urination is not done in special places until the leg lifting reaction appears. If this is true, it would have considerable importance with regard to house training.

(3) *Investigative behavior* The description of this is similar in all accounts.

(4) *Et-epimeletic behavior* The Menzels and Baege consider this under two headings· the emotion of "joy," which corresponds to our description of the food begging reaction somewhat exaggerated, and under vocalization The general descriptions of patterns of behavior agree with ours.

(5). *Contactual behavior.* All descriptions agree.

(6). *Agonistic behavior.* Baege was influenced by the work of Watson and attempted to find Watson's primary emotions in the puppy. Actually, the neonatal animals show only defensive or escape mechanisms, which are given in response to pain or discomfort. Baege found that the puppy would give a "rage reaction" when tightly held This probably was simply the puppy trying to escape when held, and this may also be the reason why others have been unable to repeat Watson's results with children (Dennis, 5) Unless the babies are hurt while held, they give no escape reaction, and, in fact, seem to enjoy it This corresponds to our results with newborn puppies

Although neonatal puppies will right themselves when turned over, we obtained no response to a sudden drop in which the puppy was not hurt Baege (and earlier Mills) found that a puppy coming to the edge of a table showed signs of distress when not completely supported. Our observations show no anticipatory reaction to falling when the head or paw comes over the edge. Once the puppy starts to fall (with fore parts not supported and hind parts still supported), it extends the fore legs and draws back the head, and may start to whine

All authors agree on the development of fighting play and dominance as far as it is described.

(7) *Allelomimetic behavior* Our results here agree with those of other authors. Mills reports "suggestive behavior" indicative of imitation on about the 40th day, a few days earlier than our first observation of group attacks.

(8) *Sexual behavior* The Menzels report that mounting behavior of male puppies may be seen as early as eight weeks, which corresponds to our observation that this behavior tends to appear toward the end of Period III

Menzel divides the development of the puppies into five periods· (I) a vegetative period up to two weeks; (II) the period of "awakening to the environment," including the third to the sixth week; (III) the whelp period, including the 7th week to the end of the 4th month, (IV) the pre-pubertal stage, from the end of the 4th to the end of the 6th month; and (V) the pubertal stage from the end of the 6th month to the end of the 10th.

It will be seen that these periods in general coincide with those of which we have used. Menzel's Period II includes our Periods II and III, and he has placed the end of it slightly sooner than ours. However, this time does coincide rather well with some of the changes in reaction to tests which are largely completed by seven weeks of age. These differences in classification are not important and are chiefly the result of the fact that any definite division has to be to some extent arbitrary.

Mills (18), who studied development up to the 60th day, found the same periods as in our own work and like us, named the second one "transition."

With regard to critical periods it is interesting to quote Mills' remark: "The period between the 17th and 45th days is that of greatest importance in the life of the dog" (p. 167). He also states, without describing the experiments in detail, that electrical stimulation of the motor areas of the cortex and associated grey matter does not have any effect before the eyes are open, and ablation at this time produces no effect on locomotion. This indicates some experimental evidence in favor of a maturation factor which produces a critical period.

The work of David Levy (12) on the sucking reflex also provides evidence on critical periods. He deprived four Collie puppies of sucking from the 10th to the 30th day of life. It is interesting to note that this overlaps the major critical period (the beginning of Period III), and he found that the frustrated dogs continued to show accessory sucking, as well as the fact that the bottle fed dogs were unable to readjust to nursing the mother. Similar unpublished experiments by Lindzey (14) on Beagle puppies during the neonatal period gave negative results. More evidence is needed, but on the whole this work tends to agree with the hypothesis of the critical period.

2. *Wolves*

All anatomists are agreed that dogs are most closely related to wolves (particularly *Canis lupus*) of any wild animals, and it is therefore of interest to compare and contrast the behavior in the domestic and various wild species. This throws a great deal of light on the adaptive nature of many features of puppy development.

The development of wolf puppies has not been studied in such detail as has that of dogs, but sufficient observational material is available to show that essentially the same course of development is followed. The general accounts of Young and Goldman (35) agree very well with the detailed observations of Murie (20), who studied both the behavior of a wild wolf pack and the development of a young captive wolf.

a *Neonatal period* This appears to be very similar in the dog and wolf, although the eyes may open somewhat earlier, according to Young and Goldman.

b. *Transition period* At about three weeks of age wolf puppies emerge from the den for the first time, which corresponds closely to the tendency of puppies to leave the nest at the end of the transition period

c *Period of socialization.* As with dog puppies, the beginning of this period is marked by extreme sensitivity to environmental stimuli, the wolf puppies being very easily frightened by loud noises, etc This is also the time when the young wolves are fed vomited food by the adults. According to Young and Goldman, weaning takes place from 6 to 8 weeks of age, which suggests that 8 weeks comes closer to being the average natural time for weaning for dogs than does 10 weeks

d *Juvenile period.* The wolf puppies and their parents leave the den at any time from the end of Period III up to three months of age During this time the parents make the kills but lead the puppies to the food rather than carrying it to them About four months of age the wolf puppies begin to hunt by themselves, which again argues for a natural subdivision of this period at about 16 weeks of age. However, the puppies still accept food from their parents, and since they stay with the parents until at least one and sometimes two years of age, and since wolves share their kills, there is no abrupt point at which food dependency ceases. Sexual maturity in female wolves comes at two years of age, and is always seasonal, occurring in March Male wolves are considered to be fully grown at three years of age This is the biggest difference between development in the two species. Apparently in the dog there has been a tendency to select for early sexual maturity, just as in many other domestic animals

In summary it may be said that as far as described, wolf and dog puppies show very similar courses of development with the exception that the wolves appear to be much more hardy, and that the dogs show earlier and irregular sexual maturity, independent of season As anticipated, the different periods of development are closely related to the natural social organization of the wild species.

3. *Other Mammals*

Detailed and accurate descriptions of the development of behavior in mammals are few in number and largely consist of occasional naturalistic observations and certain detailed studies of development under conditions of extreme domestication For purposes of comparison we have selected three widely varying and reliably studied types of mammals for the purpose of sampling the possible range of variability of development under more or less natural social conditions Since the behavior patterns involved are so different there is little point to making detailed comparisons on this basis, and we have confined our discussion to the periods of behavior. As examples we have chosen the mouse (33), representing the nest building rodents, the sheep (28), representing the herd animals, and the howling monkey (4), representing the arboreal primates, in addition to the wolf and dog (representing highly social carnivores).

a. Neonatal period This period may be defined as one in which the locomotor and ingestive patterns of behavior are adapted for infantile life only. In the case of mice, the newborn animals are even more immature than the puppies, not even possessing hair. Sheep, on the other hand, show a profound contrast, as the newborn animals are already able to walk and

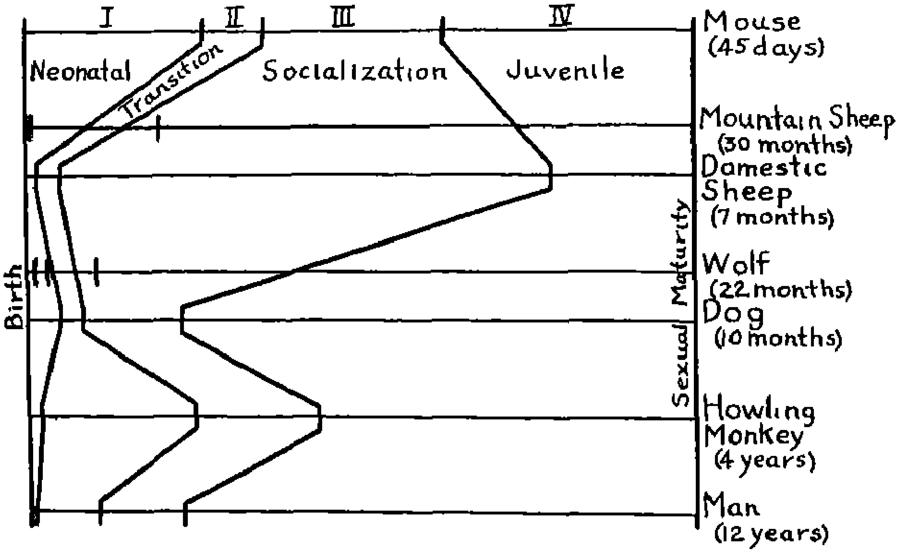

FIGURE 5
RELATIVE LENGTHS OF THE FIRST FOUR PERIODS OF DEVELOPMENT IN VARIOUS MAMMALS, BASED ON APPROXIMATE TIME OF SEXUAL MATURITY OF FEMALES

learn to eat adult food within 10 days For lambs, life may be said to begin with the transition period In the howling monkey, the newborn animals do not eat adult food and are constantly carried by the mother so that adult locomotor patterns are not present However, as contrasted with the dog and mouse, the senses of sight and hearing appear to be present at birth. In general, the importance of the neonatal period appears to be correlated with maternal protection, and the degree of immaturity seems in part to depend on the numbers of young born at the same time.

b Transition period This may be defined as the time in which the adult locomotor and ingestive patterns are developed at least in unskilled forms, in addition to the infantile ones In the nest building or lair dwelling animals the end of this period coincides with leaving the nest, whereas in the primates the end comes when the infants leave their mother's arms. In the mouse the transition period runs from about 12 to 16 days. Sheep are born in the transition period, as stated above, and it ends within 10 days In these animals there is less of an abrupt change at the end of the period In the howling monkey, the transition period is a very gradual one running over several months, although the relative length is not so pronounced considering the total length of life of the animal.

c Period of socialization. This may be defined as that period during which the young animals first come into contact with other individuals than their parents but a period during which some infantile behavior patterns are still present. In the mouse the period of socialization runs from about 16 to 28 days, when the animals are weaned During this time the young mice leave the nest and at its end (under wild conditions) completely break up connections with the parents. With sheep, on the other hand, the period of socialization is a long one, lasting through all of the first summer and resulting in establishment of the habit of following the adults In the howling monkey the period lasts from about 12 months up to the age of 21 months, when weaning takes place.

d. Juvenile period This may be defined as running from the time when the last infantile patterns (nursing) disappear until the time when adult sexual behavior patterns appear. In the mouse this lasts a relatively short time, approximately 26 to 45 days In the sheep sexual maturity appears in the first autumn, although in the wild species it does not occur until the animals are in their second year In the howling monkey this period ends at about four years. The relative length of this period compared to earlier ones is probably correlated with the longevity of the species.

There is little evidence concerning the existence or non-existence of critical periods except in the sheep where it has been shown that removal of the young lamb at birth will produce lasting effects on social adjustment, particularly if the lamb is kept isolated from other sheep beyond the beginning of Period III (28). The concept of critical periods explains why similar experiments in the dog produce no comparable effects unless the beginning of Period III is involved, which comes much later in this species It is also reported (35) that wolf puppies taken from the den after they have reached Period III cannot be tamed

4 *Man*

Consideration of the above material and especially of Figure 5 will help to put human social development in its true perspective. As a source for scientific data on human development we can use Gesell's well known studies (8, 10, 11). These originally emphasized sensory and motor development but were later extended to detailed descriptions of certain forms of social behavior which can be used for determining the length of the different periods Reference may also be made to various chapters of Carmichael's *Manual of Child Psychology* (9, 19, 23).

a Neonatal period This appears to last about four weeks in the human infant (23) During this period there is considerable evidence to the effect that conditioning takes place only with considerable difficulty and without lasting effects. In this respect the human infant is similar to the neonatal puppy, but is, of course, more advanced in sensory capacities, being able to both see and hear

b Transition period In this period the human infant attempts walking and other forms of locomotion relatively sooner than the arboreal primates

Some estimate of what course human development and maternal care might follow if not influenced by culture may be obtained from a consideration of certain motor responses Reflex grasping, once thought to be a relic of arboreal ancestry (arboreal primate infants obviously grasp their mothers rather than trees), may be considered an indication of a period in which the infant is almost constantly carried, as may the Moro or clasping reflex. The first disappears by the fourth month and the second between four and six months (23) The first signs of true locomotion (creeping) appear about 3½ months (9). It would appear that a "natural" mother would begin to carry the child less constantly about this time It would also be a "natural" time to begin supplementary feeding, since the first teeth appear about six months. The end of Period II may be placed on the average as around 15 months, when the child begins to walk.

c. Period of socialization. This begins at about 15 months, but it is very difficult to locate its end, due to the cultural processes which affect the age of weaning. A full set of milk teeth is developed at about 18 months. The natural period of weaning would probably not be before this time and might extend still later, considering the difficulties which children of this age have with digesting adult foods. Even the howling monkeys are not weaned before 18 months. It is possible that the end of Period III should be placed as late as three years, often considered the end of infancy Average growth curves show the beginning of a slight upturn at this time, which may indicate that the body is physiologically capable of dealing with adult foods

This period in human beings is complicated by the process of language learning, which is always imperfect at this time and may come later than the first social contacts The period of socialization in man contrasts with that in dogs in that it involves siblings of younger and older ages rather than litter mates. There is almost no evidence of natural sibling rivalry in the dog during this period, though similar phenomena may be seen in older animals

d. Juvenile period In man this lasts from approximately 3 to 12 years In the middle of it there is time when (at least in our society) there occurs a tendency to throw off parental and teacher authority and to join up with gangs (11) This occurs around eight years of age, and probably corresponds to the 16-week-old period in dogs, when the animals are first able to hunt their own food.

The application of the concept of critical periods to human development brings out some interesting ideas Certain critical periods should occur when new social relationships are formed The first of these occurs at birth According to Ribble (24) and some others, it is extremely important for the mother to establish the proper relationship with the baby at this time, and these ideas have been challenged by other writers (21) on the ground that the infants are highly adaptable and do not learn much from their experiences anyway According to the evidence cited above, the neonatal period is not one in which psychological trauma would be expected The two opposing points of view may be reconciled as follows: the proper patterns of nursing and feeding are vital to the development of the baby, and stimulating these probably depends upon natural and frequent bodily contacts which may act as releasers Beyond the physical welfare of the child, this should have two important effects It will determine the kind of mother-child relationship which is carried over into the later more critical periods of development, and although the baby is probably not learning much in the neonatal period, the mother is establishing good or bad habits of care which may have a profound effect later

The second critical period should theoretically come at around 15 months and extend far up to three years, the time when the child is first physically capable of forming new social contacts and relationships. One difficulty met with in human development is the fact that, whether cultural or natural, weaning often takes place during this period The resulting lack of parental "support" may hold back the child's development

As stated above, this period is also complicated by language learning, which results, among other things, in the parents feeling that the child is capable of understanding adult rules for behavior. Evidence for the existence of a critical period at this time exists in Levy's (13) study of children who show emotional consequence from operations, and it may be pointed out that this period is included within the limit set by Freud (6) for the origin of neuroses (before the age of six), and corresponds roughly to the time of development of the Oedipus complex.

As can be seen from Munn's (20) review, evidence on the maturation of the nervous system in children is far from complete. Considerable work has been done in the neonatal stage, and also at the much later stage when verbal behavior begins, but the transition period has been largely neglected. Memory is certainly present by the age of one year, but how much sooner is not definitely known. It would appear that the very important point of how much a child of this age can remember can only be determined by conditioning techniques. Until this is done, we shall not know the extent and nature of the critical periods in children. In any case, it may be tentatively concluded that the maturation of memory function does not coincide as closely with the end of the transition period as it does in the dog.

An artificial critical period is created in our society by sending children of 5 or 6 off to school where they have to assume new relationships. Usually this results in the child's placing the teacher in a maternal rôle and the other children being treated as before. Relatively few bad effects should be observed, however, since nothing really new is involved in the relationship.

The 8-year-old period should probably not be considered as a highly critical one, as the chief process there is not so much forming an entirely new relationship as throwing off the old one of parent-teacher authority.

The final and major critical period, of course, should come at the time of puberty when new types of relationships are established between the sexes. This, of course, is very much complicated by cultural teachings

The above ideas are not to be considered as final statements or pronounce ments, but rather as hypotheses which should be subject to experimental and observational tests As a guide to their use, the suggestion may be made that much of the apparently conflicting evidence on the effects of early childhood experiences may be reconciled by the hypothesis of critical periods.

G. SUMMARY

1. Theoretical considerations lead to the hypothesis that in the development of any mammal (and perhaps any higher animal) the same experiences should lead to different behavioral results at different periods This hypothesis may be labelled that of "critical periods "

2 One factor which is involved in this hypothesis is the nature of learning of the conditioning type, which indicates that first experiences in any situation are more important than later ones. A *CR* may be extinguished, but will show spontaneous recovery after rest. Primacy has also been shown to be important in human verbal memory. Applying this to social situations, it may be concluded that the times at which new social relationships are developed should be critical periods

3. A second factor involved in the hypothesis is that of maturation of the nervous system. The time immediately following the development of the capacity for conditioning or memory should also be a critical one.

4. Seventeen litters of puppies belonging to seven different dog breeds and comprising 73 individuals have been studied under standard and as nearly optimum conditions as possible, emphasizing the development of patterns of social behavior and the sensory and motor factors which affect them. The conditions of rearing are described in detail.

5 The development of social behavior in the dog falls into four natural periods up to the time of sexual maturity·

a Neonatal Period, approximately 0 to two weeks, from birth until opening of eyes. Locomotor and ingestive patterns of behavior adapted to infantile life only.

b. Transition Period, approximately from 2 to 3½ weeks, until the time the puppy leaves the nest and first notices observers. Unskilled adult patterns of locomotion and ingestion are developed in addition to the infantile ones.

c. Period of socialization, approximately from 3½ to 8-10 weeks, ending with weaning. First extensive social contacts with other individuals than parents, ending with cessation of infantile patterns of behavior.

d. Juvenile Period, approximately from 8-10 weeks to 7-14 months, from weaning till sexual maturity Adult patterns fully developed except those involved in sex and reproduction.

6. The patterns of behavior characteristic of each period are described in detail up to the age of 16 weeks.

7 Average results of behavior tests which were regularly repeated show changes at about the times dividing these periods and confirm their reality.

8 It is concluded that for the puppy the most important critical period is the early part of the period of socialization, maturation of sensory, motor, and memory capacities apparently coinciding with the first development of outside social relationships

9 Comparison with development in wolves shows close similarities except for earlier sexual development in the dog The different periods of development are closely related to the natural social organization of the wild species.

10 Comparison with the mouse, sheep, and howling monkey shows wide differences in the relative length and importance of the various periods Consideration of this fact may resolve certain apparently contradictory experimental results.

11 On the basis of information available, it is difficult to define the periods of development in human beings as accurately as those in animals because of cultural modification of behavior patterns However, it would appear that human development, like that of the howling monkey, is distinguished by a relatively long transition period.

12. It is suggested that the hypothesis of critical periods may be fruitfully applied to human studies On the basis of available data it would appear that the factor of maturation of the nervous system does not coincide as closely with the beginning of the period of socialization as it does in the dog, but probably acts at sometime during the transition period

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INTELLECTUAL AND PERSONALITY FACTORS ASSOCIATED WITH SOCIAL CLASS ATTITUDES AMONG JUNIOR HIGH SCHOOL CHILDREN*[1]

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The purposes of this investigation were to develop a questionnaire, suitable for junior high school students, based on typical social class attitudes, and to study the relationships between the questionnaire results and measures of personality, intelligence, and socio-economic status. The social class questionnaire was based on the work of Warner and his associates (9, 10), Davis and Havighurst (3, 4, 7), and others (11) among the social class theorists.

A. PROCEDURE

The questionnaire was developed from an original pool of approximately 500 items which covered a variety of aspects of social status as it has been defined and described in the literature. Social status has been defined by Warner as ". . . that . . . [which places] . . . people in the integrated structure of modern communities in terms of lower and higher levels of participation" (9). Similarly Davis has stated that ". . . persons are recognized as having equal status and as occupying the same position in the social hierarchy when they can associate freely together" (3). In this context "associating freely together" includes eating or drinking together as a social ritual, freely visiting each other's families, talking together intimately in social cliques, and having cross-sexual access to each other outside the kinship group, according to Davis.

In the literature of the social class theorists there are numerous brief descriptions of class behavior and attitudes on the various hierarchial levels On the basis of these descriptions two steps were taken in this investigation First, a pool of approximately 500 items was constructed With each item an

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attempt was made to cover some presumably outstanding and differentiating characteristic of a given social class. There were, then, about 85 items relating to each of the six social classes found in Warner's descriptions (9). The second step taken was to bring together from various sources the bit-by-bit descriptions of the six social levels and organize them into a relatively complete one-page description of each class.

A group of five raters then worked independently to sort the 500 items into the six social classes using the class descriptions as the criterion for each class. Tabulations were then made to determine the extent of agreement on all items by all five raters as to what class level each item belonged. On the basis of complete agreement among the five raters, and in some cases minimal disagreement, 330 items were retained for empirical study in criteria situations

B Sampling

The 330 items were then mimeographed to form the first draft of the social class attitudes questionnaire and were given to 250 children, in the eighth and ninth grades, from settlement houses, private schools, and lower and middle economic area public schools. Seventy-five children each, from lower and upper economic areas and 100 from middle economic areas were thus tested. The items were answered on an Agree or Disagree basis with provisions made for the students to mark those items they did not understand for any reason. An attempt was made to score these results by using six scoring keys—one for each of the six classes, upper-upper through lower-lower—but this attempt proved to be impossible. The six separate keys netted inconsistent results when compared to the social and economic stratas from which the children were drawn. On the other hand a three-way scoring system, scoring the questionnaire in terms of upper, middle, and lower class levels, agreed well with the independent criteria of the social and economic levels from which the children came. After the three-class scoring was completed a second item analysis was made to determine which items differentiated between each class level and the other two class levels, for this step the Edgerton-Paterson tables (5) were used to determine the reliability of the differences between classes. All items marked as ambiguous by the students were eliminated at this point. The 40 most reliable items for each social class were then used to form the final edition of the questionnaire, there being 120 items, 40 for each of the three class levels, in the final edition. Of the 40 items for each social class scale 24 reliably differentiated between the upper class and the other two classes at the .01 level, 11 at the .01 level differentiated between the middle class and the other two classes, and 25 items differentiated between the lower class and the other two classes at this level. It was, then, easier to get more discriminating items for the upper and lower class levels than for the middle class. This may be the result of the nature of the class descriptions used by the raters, the nature of the items themselves at the three class levels, or due to the possible fact that middle class ideas and attitudes are distributed throughout the entire social structure in a manner different from which lower and upper class ideology is dispersed. Reliability figures for the three social class keys, based on 65 cases drawn off for this purpose, were: lower class, .883, middle class, .864, upper class, .890, where the computations were made by the split-half method and corrected by the Spearman-Brown prophesy formula (8).

C. THE MIDWEST VALIDITY STUDY

The final form of the social class questionnaire was then given, along with the California Personality Test, Intermediate Form (2), to 81 ninth and 111 tenth grade students at Midwest, a community of approximately 6,000 inhabitants near Chicago where social class studies have been in progress for several years. The main reason in giving the questionnaire to the Midwest group was for a further check on the validity of the test. Midwest was excellent for this purpose because of the studies that had been done there on social class status and because the family of each child tested in the Midwest group was well understood in terms of the social hierarchy. The Midwest study was incomplete because there were no upper class children; however adequate comparisons of the scores of middle and lower class children was possible and by indirect validation their upper class questionnaire scores were of value.

The California Personality Test was given at Midwest because it was to be used later in a study of Twin Cities children. Data on the Otis Quick Scoring test was already available in the Midwest population, hence is included here. Table 1 gives the means and standard deviations on the three tests for the Midwest ninth grade group. The social class questionnaire

TABLE 1
MEANS AND STANDARD DEVIATIONS ON ALL TESTS FOR THE MIDWEST NINTH GRADE
($N = 81$)

	Social class Questionnaire Lower	Middle	Upper	California I	II	Otis (*IQ* Equivalent)
Mean	18.77	22.38	16.76	47.09	51.11	110.03
SD	8.22	3.91	4.88	6.21	5.12	10.07

results mean that, in the case of the lower class (L) group, on the average 18.77 items of the 40 items in the scale were answered "Agree," and so on for the other two scales of the questionnaire. The California test results agree closely with the published norms for this test given in the manual (2). The Otis results are about what one would expect from a public school ninth grade group subject to no particular selective factors with regard to intelligence.

Table 2 breaks down the ninth grade population into 35 middle and 46 lower class children. The test results in this table appear to follow one's expectations, particularly with regard to the differences in the questionnaire scores between the two social levels. Table 3, showing the critical ratios between the two social classes on all three tests, bears out these expectations. Tables 2 and 3 show that the middle and lower class questionnaire results net reliably higher scores for these two classes, respectively, and that the upper class questionnaire results between the two classes are negligible. The latter point constitutes indirect validity for the upper class scale in that it remains virtually unchanged between the lower and middle class populations. The Midwest lower class is reliably lower on the California I test and on the Otis. Similar California and Otis test results are obtained when the ninth grade population is divided into lower and middle classes on the basis of questionnaire results with the Midwest social class field study result acting as the dependent variable.

TABLE 2

MEANS AND STANDARD DEVIATIONS ON ALL TEST RESULTS FOR TWO MIDWEST SOCIAL CLASSES, NINTH GRADE

	Social class Questionnaire			California		Otis (*IQ* Equivalent)
	Lower	Middle	Upper	I	II	
	Midwest Middle Class (*N* = 35)					
Mean	13.10	25.41	16.32	49.18	52.21	116.02
SD	6.73	3.88	4.88	6.14	6.59	6.75
	Midwest Lower Class (*N* = 46)					
Mean	23.09	18.96	17.19	45.50	50.41	105.10
SD	7.00	4.51	4.77	6.10	6.02	9.56

TABLE 3

CRITICAL RATIOS BETWEEN MIDWEST MIDDLE AND LOWER CLASSES FOR ALL TEST RESULTS, NINTH GRADE

Social Class Questionnaire			California		Otis
L & L	M & M	U & U	I & I	II & II	(*IQ* Equivalent)
6.48	6.92	1.03	3.40	1.26	5.94

The association between the two social class stratifications, the Midwest field studies and the questionnaire, in terms of a 2 x 2 contingency table computed from X^2 (8) was $C = .35$, where the maximum value for a 2 x 2 table is 866. Entering Peters and VanVoorhees tables for correction for broad grouping (8, p. 398) the C of .35 becomes .41 if the distributions are considered as normal or as portions of a normal curve, or .37 if the distribution is considered to be rectangular. These results indicate the presence of a reliable relationship between the two measures of social class status

Findings similar to the ninth grade population were obtained in the Midwest tenth grade group of 111 students. To save space only the critical ratios between the test results from the Midwest lower and middle classes and the degree of association between Midwest social class and the questionnaire social class ratings will be given. Table 4 gives the critical ratios for the two class levels, lower and middle, from the Midwest tenth grade The California test means were virtually the same hence the *CR*'s are omitted; the Stanford-Binet were already available at Midwest hence are used here as was the Otis test results with the ninth grade. The results from Table 4 for the tenth grade are similar to those in Table 3 for the ninth grade, except for the upper class scale results from the questionnaire. This may result from greater selectivity as to social class status in the tenth grade compared to the ninth grade. The two methods of assigning class rank in this population are associated to the extent of $C = 42$, as computed by the mean square contingency method using a 2 x 2 table.

TABLE 4
CRITICAL RATIOS FOR ALL TESTS BETWEEN THE TWO MIDWEST SOCIAL CLASSES, TENTH GRADE ($N = 111$)

Social Class Questionnaire			California		Stanford-Binet *IQ*
L & L	M & M	U & U	I & I	II & II	
3.00	3.54	3.00	——	——	3.04

Considering the validity of the social class questionnaire reasonably well established, the next step was to administer it to a fresh group of students in the Twin Cities.

D. THE TWIN-CITIES STUDY

The population in the Twin-Cities study consisted of 670 eighth and ninth grade students from two private and three public schools, the latter coming from three widely different social and economic areas as shown by school survey results and by observations of the respective neighborhoods. Of the 670 students, 345 were boys and 325 girls All tests were administered, as were those above, in small groups (usually 20 to 30 students per group). Three tests were given: the social class questionnaire, the California Personality test, Intermediate Form, and the Terman group test of mental ability. Socio-economic status, in terms of the father's occupation was also obtained on this population Table 5 gives the intercorrelations for all tests in the Twin Cities population

TABLE 5

Test Intercorrelation and Standard Errors for the Total Twin-Cities Population ($N = 670$)

	Ques L	Ques M	Ques U	Calif I	Calif II	S-E-S
Terman	—.394 (±.032)	+.263 (±.036)	+.141 (±.041)	+.281 (±.036)	+.188 (±.037)	—.397 (±.032)
Ques L		—.076 (±.044)	+.176 (±.038)	—.329 (±.034)	—.343 (±.033)	+.427 (±.030)
Ques. M			+.386 (±.032)	+.417 (±.030)	+.376 (±.032)	—.331 (±.034)
Ques U				+.315 (±.034)	+.328 (±.034)	—.220 (±.037)
Calif I					+.669 (±.021)	—.308 (±.033)
Calif. II						—.199 (±.037)

The correlations in Table 5 show that the higher one's middle class questionnaire scale results the higher one's Terman intelligence test score; also the higher one's lower class questionnaire scale score the lower one's Terman score. It may well be that much of the content of standard intelligence tests is over-weighted with items that are more from the middle class culture than from other portions of our social structure. This is one tenable hypothesis, at least, to account for these results; a more obvious and conventional one is that social class status is selective with regard to intelligence. An item analysis of the intelligence test results in terms of class status could throw considerable light on this problem. It may be that certain types of intelligence test items are better answered by lower class members and other types of items better answered by middle class members and that certain tests, by virtue of the weighting of given types of items, are bound to show superior results for one class level. The same types of relationships are also shown between the social class questionnaire results and both forms of the California Personality test in Test 5. An item analysis of this material, to be published later, will examine several hypotheses regarding this finding.

The social class questionnaire and socio-economic-status (S-E-S) results are important in bringing out the relationship between these two types of measures of social and economic levels. The S-E-S (1, 6) measures ranged from Group I (professional) to Group VII (day-laboring work), hence the inverse relationship between this measure and the middle and upper class scales of the social class questionnaire. The S-E-S measure was based on occupation of the father of each student studied in this population. The results show that the lower one's S-E-S rating the higher will be one's scores on the lower class scale of the questionnaire; the opposite relationship exists between S-E-S and the middle and upper class scales of the social class questionnaire. From these correlation figures it is apparent the two measures of social status are related to a substantial degree yet each is covering somewhat separate aspects, and that social status in the Warner sense—insofar as the social class questionnaire covers it—is not the same thing as a simple S-E-S rating on the basis of occupation.

Table 6 gives the means and standard deviations on all test results for the Twin Cities population. It can be seen that the social class questionnaire results are closely related to the independent measures of social levels in this

TABLE 6
MEANS AND STANDARD DEVIATIONS ON ALL TESTS FOR EACH SOCIAL CLASS AND FOR EACH SEX WITHIN EACH SOCIAL CLASS

	(N 77)	(N 60)	(N 137)	(N 188)	(N 200)	(N 388)	(N 80)	(N 65)	(N 145)
	L-Class Group Terman			M-Class Group Terman			U-Class Group Terman		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Mean	86.22	88.60	87.26	120.01	113.78	116.73	120.00	127.54	123.31
SD	22.31	23.37	22.77	36.14	32.16	34.42	34.84	24.02	27.21
	L-Class Ques.			*L-Class Ques*			*L-Class Ques*		
Mean	23.40	18.42	21,22	16.63	12.57	14.49	15.40	10.92	13.40
SD	6.61	4.50	5.61	5.08	6.38	5.64	5.03	4.74	6.21
	M-Class Ques			*M-Class Ques*			*M-Class Ques*		
Mean	20.32	21.75	20.94	27.26	28.97	28.36	24.50	27.80	26.46
SD	3.40	4.37	3.82	3.92	3.38	3.64	4.84	3.43	4.20
	U-Class Ques			*U-Class Ques*			*U Class Ques*		
Mean	18.34	19.30	18.76	22,26	22,58	22.45	25.70	27.80	26,46
SD	4.27	4.01	4.13	5.04	5.31	5.18	4.84	3,43	4.20
	Calif I			*Calif I*			*Calif I*		
Mean	48.70	50.27	49.40	58.25	61.30	60.02	48.78	69.57	58.04
SD	5.52	5.07	5.28	8.79	8.51	9.60	6.15	9.65	7.70
	Calif II			*Calif II*			*Calif. II*		
Mean	51.01	54.47	52.62	60.11	64.14	62,21	54.81	72.01	61.20
SD	6.30	5.66	5.72	10.69	10,29	12.01	8.15	11.91	9.83

population. This is further borne out in Table 7 which presents the critical ratios between the three social levels on all tests.

TABLE 7

Critical Ratios of the Differences between the Three Social Classes on All Tests for the Twin-Cities Population ($N = 670$)

	L- & M-Class	L- & U-Class	M- & U-Class
Terman	11.25	12.05	1.61
Ques. L-Class	12.02	10.86	1.81
Ques. M-Class	19.52	7.00	12.25
Ques. U-Class	9.32	11.83	9.11
California I	16.10	11.07	2.53
California II	12.29	9.03	1.00

Sex differences were found to be unreliable at the .10 level on the Terman test within each of the three class levels. Regarding sex differences on the social class questionnaire, the boys scored reliably higher on the lower class scale ($CR = 6.22$), the girls scored reliably higher on the upper class scale (at the .02 level), but there was an unreliable sex difference on the middle class scale of the questionnaire. The generally greater aggressiveness of males probably allowed them to score higher than girls on the lower class scale of the questionnaire; this fits with the concept of lower class people as being more aggressive than middle and upper class members. The generally greater interest on the part of girls in morals, etiquette, conventional social standards and activities probably accounts for their higher scores on the other two scales.

E. Analysis of Groups Deviating from Their Allegedly True Social Class

The question naturally arises regarding those individuals who obtained social class questionnaire scores deviating from their allegedly "true" social class. What, for example, are the characteristics of individuals from the middle class group who receive their highest social class questionnaire scores on the lower or upper class scales? Without reporting these data in detail the following summary of such findings, relating to deviations from all three social class levels, is given. First, all deviate groups show reliably lower Terman intelligence test results compared to the "pure" class level group to which they allegedly belong and from which they significantly deviate on the social class questionnaire. Second, the deviate groups show patterns of mean scores on all three of the social class questionnaire scales more like the class toward which they deviate than like the "pure" class members from which they deviate This means that the change in social level, as reflected in the attitudes sampled by the test, is an over-all change affecting all scales of the questionnaire, it is not simply a one-scale change To some extent this over-all shift is understandable in terms of the intercorrelations between the three scales, but there is more to the shift than can be accounted for in such terms. The third characteristic of these deviate groups is that most of them show lower mean scores (poorer adjustment) on the two sections of the California Personality test than do the "pure" groups.

Several factors undoubtedly play a part in these results Perhaps the most important is the intelligence factor, which is the largest and most consistent difference between the "pure" and deviate groups, in that the less intelligent ones cannot fully grasp the meaning of the items or they are not able to reflect clearly enough on their experience and attitudes to be able to report them correctly on the questionnaire. Being less intelligent they may have more adjustment problems, hence score reliably lower on the personality test It may also be that their adjustment is a prime factor and that poor adjustment carries with it a certain amount of rejection of one's usual mode of living, the rejection being not only away from one's own class level but toward another portion of the social range, upward or downward. Being poorly adjusted may militate against one receiving higher intelligence test scores, particularly in group testing situations It is really not important which is first or foremost, personality or intellectual factors and, indeed, such a question is probably meaningless in terms of the present data; but the fact that both sets of factors are apparently closely related to class status change is important and needs further study Within this area lay many interesting problems relating to social mobility and to the completeness with which an individual assimilates the culture of his parents in terms of their social behavior and their social attitudes

F. SIMILARITIES AMONG SOCIAL CLASSES

Lest one gain the impression that social class differences are all pervasive, it should be pointed out that there is considerable overlapping of social attitudes from one class to another. This, of course, is obvious if one consults the tables of means and intercorrelations presented above, similarities are as striking as are differences. Three steps in the item analyses of the original pool of items show further that the extent of similarities between the social classes is considerable and that study of similarities has been neglected. It will be remembered that 120 of the 330 items which comprised the first draft of the questionnaire were selected for the final form, and that

220 items were discarded. Grouping these two sets of items, the selected and the discarded, in terms of nine topics—e.g., sex and marriage, work and occupation, education and school, etc.—showed that the percentage of selected and discarded items under each topic did not vary significantly. An item found to fall under one of these topics was equally likely to be selected or discarded, at least insofar as the topic covered in the item was concerned.

A second aspect of the item analysis, that relating to the 220 discarded items, shows that since these items did not differentiate reliably between the three social classes they covered aspects of social behavior and social attitudes which were essentially similar among the social classes. In a study searching for class differences these items would naturally be discarded, but for one interested in class similarities they are of special concern. Further study of these items might reveal a number of ways in which our whole social structure is based on similar attitudes.

The third aspect of class similarities, stemming from the item analyses, revealed that there were 19 items showing unanimous or nearly unanimous acceptance by all classes and 14 items showing nearly unanimous rejection by all classes. Although it was not the purpose of this study to go into the problem of class similarities in attitudes, the data show that the problem is an intriguing one. If class differences were all pervasive our social structure would not have the stability and flexibility that it now has. It is apparent that the stability and flexibility of the social structure must be based, in part at least, on similar attitudes and behavior patterns running throughout the society. Just what areas of behavior and attitude constitute the core of the similarities is as yet poorly understood. Because of their cohesive and perhaps conservative character the aspects in which all peoples of our society are in essential agreement should be given more study. Within such an area of study one might gain some information regarding what aspects of the social structure are relatively amenable or resistent to change, which aspects are liable to contain vulnerable spots with regard to class dissentions and strong feelings, and which aspects are integrated into our prevailing and often idealized attitudes toward ourselves as a Democracy. The attempt here has been simply to point out the potential value of such inquiries, not to attempt any analyses on the basis of the present findings.

G. SUMMARY

A social class questionnaire for junior high school students, based on the attitude and behavior characteristics of the various social classes as shown in the studies of Warner and his associates, was developed.

The final form of the questionnaire contained 120 items, 40 items for each of three classes, lower, middle, and upper. The separate scales had reliability coefficients of .883, .864, and .890 for the lower, middle, and upper classes, respectively. Validity studies were carried on among disparate social and economic groups from public and private schools and from settlement houses in the Twin Cities, and among students at Midwest where social class studies have been in progress several years.

The social class questionnaire was found to differentiate between social class levels in terms of the above validity criteria. Studies were made of the personality, intelligence, and socio-economic-status characteristics of the students who belonged to the three social class levels according to the questionnaire results; such studies were carried on among the validity group at Midwest, and later among a second group of 670 Twin Cities junior high school students.

The results show, among other things, that the lower social class members score reliably lower on intelligence and personality tests than do middle and upper class members; that boys score reliably higher on the lower class scale while girls score higher on the middle and upper class scales, and that members deviating from their allegedly "true" social class level score reliably lower on personality and intelligence tests than do the so-called "pure" members of a given class.

A study of similarities in attitudes and behavior between the three social class levels shows them to be common and pervasive; that such similarities may serve as a cohesive or conservative factor in our society was suggested. It was further pointed out that class similarities studies have been neglected by social class theorists. Some suggestions regarding research along these lines are given.

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CHILDREN'S CONCEPTS AND STEREOTYPES OF POLISH, IRISH, FINN, HUNGARIAN, BULGARIAN, DANE, CZECHOSLOVAKIAN, HINDU, AND FILIPINO*

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Stereotypes are rooted in the contents and images of myths and legends and are definitely associated with values highly colored by emotions and feelings. Emotions play a predominant rôle in man's conduct Most of his concepts are tied with favorable or unfavorable feeling tones These feelings determine his attitudes, his emotional tendencies to act in relation to situations, objects, or persons. In many cases these attitudes are not based on fact but are the outcome of stereotypes which the child learns from his cultural environment. The adoption of stereotypes may block the acceptance of contradictory evidence and make learning of the truth difficult.

The aim of intercultural education is to give the child correct knowledge and appreciation of other cultures and peoples. It is necessary to know what are the children's national and racial stereotypes and concepts before correct information and attitudes can be taught to them The purpose of this report is to give children's concepts and stereotypes of Polish, Irish, Finn, Hungarian, Bulgarian, Dane, Czechoslovakian, Hindu, and Filipino.

The subjects of this study, tested in June, 1931, were 200 sixth-grade, 12-year-old children, with a large percentage of Jewish children, 98 per cent of whom were native-born More than half their parents were also native-born, and many of them were of German-Jewish and Russian-Jewish descent. There were also Protestant, white, native-born children and a few Negro children. The average chronological age of the children was 12 years and the average mental age, according to the Otis Group Intelligence Test, was 14 years and four months. The socio-economic background, according to the Sims Score Card, was somewhat below "very high." The children attended a Cincinnati suburban public school whose enrollment was approximately 1,600 students in 1931 and somewhat less in 1944 Other subjects were 174 12-year-old children of the same age, grade, school, and background, tested in June, 1944, and another similar 100 subjects of the same

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school, tested in December, 1944 The data for both 1944 groups were combined

The children were given the Zeligs' Intergroup Attitudes Test This requires the children to express willingness or unwillingness to have the relationships of cousin, chum, roommate, playmate, neighbor, classmate, and schoolmate, with each of 39 races and nationalities. To obtain the children's concepts and stereotypes they were asked to write what they considered true, interesting sentences about each of the races and nationalities listed on the test. Another method was to have the children write a word or phrase describing the appearance, character, or personality of the race or nationality mentioned.

The data were tabulated to get the children's concepts and stereotypes for each race and nationality mentioned The reactions were grouped under favorable, unfavorable, neutral, and "don't know" concepts.

TABLE 1
CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF POLISH FOR 1931 AND 1944

Favorable 1931 32%	Favorable 1944 15%
1. Have good musicians	1. Good fighters
2 Have interesting history	2 White skin
3 Are good fishermen	3 Simple, good, nice, kind, O K, swell, strong, warm feeling, courageous, hard striving
4. Are good dancers	4 Peaceful
5 Are good wood carvers	5 Musicians and piano composers
6. Work hard	6 Good workers
7. Ice-skate well	7 Good farmers
8 Once a rich state	8 Rich land-owners
9 Have their own government	9 Look like us
	10 Very religious
	11 Like bright colors
Unfavorable 1931 10%	**Unfavorable 1944 6%**
1 Government not well organized	1 Very poor people
2 Yellow-colored race	2 A little sloppy
3 Not like Americans	3 Dirty
4 Are poor	4 Pogroms
	5 Funny
	6 Foreigners
	7 Give up easily
	8 War-captured

Table 1 shows that 32 per cent of the 1931 reactions to Polish were favorable. They stated that they have good musicians and an interesting history, work hard, are good fishermen, and are good wood-carvers They dance and ice-skate well They have their own government and were once a rich state

The 10 per cent unfavorable replies were that the government was not well organized and the people poor, a yellow-colored race, and not like Americans. The 42 per cent neutral concepts mentioned geographic facts, cities, rivers, and industries. Only 15 per cent of the 1944 concepts were favorable. They described the Polish as good fighters, simple, good, nice, kind, O.K., swell, strong, courageous, hard-striving, and peaceful. They have white skin, look like us, are religious, are good workers, farmers, and landowners. They are musicians and composers.

Six per cent of the 1944 concepts were unfavorable and described the Polish as very poor, a little sloppy, dirty, foreigners, war-captured, give up easily, and have pogroms. The 68 per cent neutral concepts mentioned Poland, Poles, and persons from Poland many times. Associations included relatives who had been born there and geographic statements. The trend is toward fewer favorable reactions and more neutral ones.

Table 2 shows that 31 per cent of the concepts for Irish were favorable.

TABLE 2

CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF IRISH FOR 1931 AND 1944

	Favorable 1931 31%		Favorable 1944 46%
1	Live in a free state	1	Like Irish accent
2	Clean, good-natured, happy, simple people	2	Lucky four-leaf clover
		3	"When Irish Eyes Are Smiling"
3.	Short, fat, rosy-cheeked	4	Fine, kind, friendly
4	Nice accent	5	Nice, good, polite, jolly, gay, swell
5	Are interesting and amusing	6	Like songs and music
6.	Very hospitable	7.	Happy-go-lucky
7	Have beautiful homes	8	Funny, merry
8.	I am Irish	9	Gay colors, pretty costumes
9	Are good singers	10	White people
10	Are thrifty and hard-working	11	Freedom lovers
11	Make pretty lace and handkerchiefs	12	Peaceful
		13	Lucky Irish
12	Have good education	14.	Religious
		15	Good skaters
		16.	I am Irish
		17.	Good dancers
		18	Like "Abie's Irish Rose"
		19	Work hard
		20	Thrifty
	Unfavorable 1931 3%		**Unfavorable 1944 8%**
1.	Don't like them	1	Bad tempers
2	Have bad tempers	2	They fight
		3	Stuck-up
		4	Not smart
		5	Tough
		6	Nobody likes them

They live in a free state, are clean, good-natured, short, fat, rosy-cheeked, simple, happy people, with a nice accent, who are interesting and amusing, are good singers and well educated, have beautiful homes and are very hospitable. They are thrifty, hard-working, make beautiful lace and handkerchiefs.

Three per cent of the 1931 concepts were unfavorable and described the Irish as having bad tempers and not being liked. There were 66 per cent neutral concepts. These were that the Irish wear green, are growers of Irish potatoes, have St. Patrick as their patron saint, like the Shamrock, and are superstitious about a special flower. Also, there are more Irish in the United States than in Ireland, they are farmers, jokes are made about them, and we have an Irish maid.

The 1944 favorable concepts showed an increase to 46 per cent. The children mentioned the Irish accent, the lucky four-leaf clover, "When Irish Eyes Are Smiling," and "Abie's Irish Rose." The Irish are fine, kind, friendly, nice, white people who like gay colors, pretty costumes, songs and music, and love peace and freedom. They are good skaters and dancers, work hard, and are thrifty.

Eight per cent unfavorable concepts said the Irish had bad tempers, fight, and are tough. They are stuck-up, not smart, and nobody likes them. Forty per cent neutral reactions were Ireland, Blarney stone, policeman, "Rosie O'Grady," "Mollie Malone," the Shamrock, and elocution pieces. The children's image of the Irish for the two periods studied have many common elements.

Table 3 gives the concepts of Finn. Twenty-five per cent were favorable in 1931. They said the Finns are good fishermen, are merry, strong, and smart, hold pole vault records, are sailors and explorers, and were once Vikings.

TABLE 3
CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF FINN FOR 1931 AND 1944

	Favorable 1931 25%		Favorable 1944 21%
1	Good fishermen	1	Good fishermen
2.	Merry, strong, smart	2	Bold, brave, fighters
3.	Hold pole vault record	3	Fight for freedom
4.	Are sailors and explorers	4	Good, O K, nice, kind, clean, strong, hardy, quaint
		5	Good workers
	Unfavorable 1931 6%		**Unfavorable 1944 7%**
1	Plan revolutions	1.	Enemy of Russia
2	Dark people	2	Mean, nasty, disagreeable
3	Not well educated	3.	On Germany's side
4.	Have fat wabbling faces and yellow skins like Japs		

Six per cent unfavorable concepts said the Finns are dark people who have fat, wabbling faces and yellow skins like the Japs, are not well educated, and plan revolutions Thirty-nine per cent neutral concepts said they live in cold countries and are used to cold weather, live near the Black Sea, dress in reindeer skin, and eat the same things the Eskimos do. Thirty per cent of the reactions were "don't know" The 21 per cent favorable concepts given in 1944 were also very sketchy and described the Finn as good, O K, nice, kind, clean, quaint, strong, and hardy, and they fight for freedom.

Seven per cent unfavorable reactions said they were mean, nasty, disagreeable, enemies of Russia, and friends of Germany. The neutral concepts were Finland, people from Finland, cold weather, herders, forest-land, and woodchoppers Twenty-five per cent were marked "don't know."

Twenty-three per cent of the 1931 concepts of Hungarian were favorable, as shown in Table 4 They said the Hungarians are good musicians. They love bright colors, dress simply in quaint costumes, and are clean, strong, and polite They work hard, are strong, and are good farmers, good fighters, and musicians

TABLE 4
CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF HUNGARIAN FOR 1931 AND 1944

	Favorable 1931 23%		Favorable 1944 17%
1	Are good musicians	1	Gay dancers
2	Are good cooks	2	Beautiful gay music
3	Make good goolash	3	Hungarian Rhapsody
4.	Love bright colors	4	Gay
5	Dress simply	5	Kind people
6	Quaint costumes	6	Natural, simple people
7	Clean	7	Honest
8	Polite	8	Out-of-door type
9	Work hard	9.	Pretty, gay costumes
10.	Good Fighters	10	Simple life
11.	Strong	11	Country is like Switzerland
12.	Good farmers		
	Unfavorable 1931 12%		**Unfavorable 1944 3%**
1.	Belong to yellow race	1.	Gypsies
2.	A poor people	2	Treason
3.	Are backward	3.	Sloppy
		4	Foreigners

The 12 per cent unfavorable responses were that they belong to the yellow race, are poor and backward. Forty-one per cent of the concepts were neutral They were united with Austria, have a boy king, are peasants, own fruit stores, and are good maids Twenty-four per cent were marked "don't know"

In 1944 17 per cent of the concepts were favorable. The Hungarians have beautiful, gay dances and music and the Hungarian Rhapsody. They are gay, kind, natural, simple, out-of-door type people who wear pretty, gay costumes, and lead a simple life The 3 per cent unfavorable concepts held that they are Gypsies, sloppy, and foreigners

Fifty-five per cent of the concepts were neutral. Hungary and hungry were given most often, also oil-wells, Russia, peasants. Twenty-five per cent were marked "don't know." The data indicate little change in the trend of concepts about Hungarian

In 1931 there were 22 per cent favorable concepts of Bulgarian, as shown in Table 5. They are considered industrious, kind, quaint, outstanding people, of the white race, who like to sing and dance. They are good traders, have rich beds of iron, and make tops. They have a cute princess

TABLE 5

CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF BULGARIAN FOR 1931 AND 1944

Favorable 1931 22%		Favorable 1944 5%	
1	Industrious	1	Nice, O K., quiet
2	Kind	2.	Bright costumes
3	Good traders		
4	Outstanding people		
5	Quaint		
6	Princess is cute		
7	White race		
8.	Love to dance and sing		
9	Have rich beds of iron		
10	Make tops		
Unfavorable 1931 14%		**Unfavorable 1944 4%**	
1.	On German side in war	1.	Odd people
2.	Queer	2	Shabby-looking, dirty
3.	Cruel	3	Coward allies of Germany

The 14 per cent unfavorable responses said they are queer, cruel, and were on the German side in the war. Sixteen per cent neutral concepts said most of the people are peasants who live in Europe, near Austria. There were 49 per cent "don't knows."

In 1944 there were only 5 per cent favorable responses. They said the Bulgarians are nice, O.K., quaint, and wear bright costumes. Four per cent unfavorable reactions said they are dirty, shabby-looking, odd people who are coward allies of Germany. Forty-four per cent of the concepts are neutral Most of these mention Bulgaria, Balkins, Europe, and bull "Don't know" covered 47 per cent of the reactions, thus indicating little knowledge about these people.

TABLE 6
CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF DANISH FOR 1931 AND 1944

	Favorable 1931 18%		Favorable 1944 31%
1	Great sea-rovers	1	Danish rolls and pastries
2	White race	2	Great Dane dogs
3	Joyful people	3	Nice, clean, kind, O K, neat
4	Raise finest cows in world	4	Happy, polite, brave, friendly, helpful, fair
6	Hans Christian Anderson	5	Like their holidays
		6	Have nice dances
		7	Pretty costumes
		8	Underground saboteurs
		9	Revolted against Nazis
		10	Comedians
		11	Good fishermen
		12	Were Vikings
	Unfavorable 1931 2%		Unfavorable 1944 1%
1	Are not always good	1	Poor type
		2	Don't like them

Table 6 gives 18 per cent of the concepts for Dane as favorable in 1931 They are great sea-rovers, belong to the white race, are joyful and hardy. They raise the finest cows in the world. The writer, Hans Christian Anderson, was Danish.

Two per cent unfavorable remarks were that they are not always good Thirty-four per cent of the statements were neutral These were that they once ruled England, King Arthur fought against them, and they were once united with Sweden and Norway. They have an old king who plays tennis and golf They make cheese and butter and do much trading. Forty-six per cent of the concepts were marked "Don't know"

In 1944 there were 31 per cent favorable associations. Danish rolls and pastries were in the lead, then came great Dane dogs. The people were described as nice, clean, kind, O.K., happy, polite, brave, friendly, neat, helpful, and fair. They have nice dances and pretty costumes. The underground saboteurs revolted against the Nazis. They have good fishermen and comedians.

The unfavorable one per cent remarks stated they were a poor type and not liked. Twenty-six per cent of the concepts were neutral These mention Dane, Denmark, Dainty, and some geographical facts Forty-two per cent concepts were marked "don't know"

Table 7 shows that in 1931 17 per cent of the concepts of Czechoslovak were favorable They are industrious people, good manufacturers, skillful in making ornaments, and are good farmers. They dress quaintly in bright

TABLE 7
CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF CZECHOSLOVAKIAN FOR 1931 AND 1944

Favorable 1931 17%	Favorable 1944 22%
1. Skillful in making ornaments	1 Peaceful, nice, kind, gay, neat, brave
2 Are manufacturers	2. Tough fighters
3. Industrious people	3. Underground guerrillas
4 Good fighters	4 Pretty costumes, puffed skirts
5 Dress quaintly	5. Nice dances
6. Like bright colors	6. Look like us
7 Good farmers	7 Love freedom
	8 Poor but strong
	9 Rich
	10. Made my doll
	11 Make pretty things

Unfavorable 1931 8%	Unfavorable 1944 2%
1. A dark race	1 Dress funny
2. Are foreigners	2. Foreigners
3 Like to roam	3 Poor country
4 Were slaves	
5 Are slaves	

colors The 8 per cent unfavorable remarks were that they are a dark race, foreigners, like to roam, and are and were slaves. Neutral concepts, 34 per cent, were mostly historical and geographical statements, there were 42 per cent "don't know"

In 1944 22 per cent of the reactions were favorable. These said that the Czechoslovakians are peaceful, nice, kind, gay, and neat. They have pretty costumes with puffed skirts and have nice dances. They make pretty things and dolls. They look like us and love freedom. They are poor but strong and brave, tough fighters, and underground guerrillas.

The 2 per cent unfavorable remarks say that they dress funny, are foreigners, and have a poor country. Neutral concepts, 41 per cent, said they were invaded and conquered by Nazis, are Czechoslovakians, Checks, and checkers. Thirty-five per cent of the responses were "don't know."

Table 8 shows that in 1931 14 per cent of the responses to Hindu were favorable. Gandhi is highly cultured. The Hindus are an old people, are magic workers, strong, brave, hard-working, interesting, intelligent, and very religious.

Unfavorable concepts, of which there were 35 per cent, presented an image of a dark-skinned, fierce-looking, superstitious, unfriendly, poor, funny-looking people, who wear little clothes, are robbers, live in the desert, are at war now rioting with England Forty-three per cent were neutral responses. They said the Hindus are under British law and want their inde-

TABLE 8
CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF HINDU FOR 1931 AND 1944

	Favorable 1931 14%		Favorable 1944 10%
1.	Gandhi highly civilized	1.	Have many religions
2	Are great magic workers	2	O.K
3	Are interesting	3.	Beautiful clothes
4	Are intelligent	4	Race of God's people
5	Strong and brave		
6	Very religious		
7.	An old people		
8	Work hard		

	Unfavorable 1931 35%		Unfavorable 1944 31%
1	Have dark skin	1	Natives
2	Rioting with English	2	Have dark skin
3	Are fierce-looking	3.	Are queer
4	At war now	4.	Snakes
5	Are queer	5.	Savage
6	Have odd religion	6	Uncivilized
7.	Unfriendly	7.	Wear little clothes
8	Are superstitious	8	Pagans
9	Wear little clothes	9	Famine
10	Funny in the movies	10	Thin
11	Funny looking	11	Foreigners
12	Poor	12	Jungle men
13	Live in desert	13	Funny songs
14	Are robbers	14	Poor
		15	Dirty
		16.	Enemy
		17	Bow legs
		18	Superstitious
		19	Funny
		20.	Sneaky

pendence. They wear turbans and light clothes, are Mohammedans, priests, and snake charmers. They are out in the sun most of the time. They live in clans and cannot marry outside of the clan. They are not allowed to eat meat, are a mystic people with black eyes who ride elephants. There were 11 per cent "don't know."

In 1944 the 10 per cent favorable reactions said they had many religions, were a race of God's people, had beautiful clothes, and are O.K. The 31 per cent unfavorable responses said they are queer natives with a dark skin, are savage, uncivilized pagans who wear little clothes, are thin and bow-legged, and suffer famine. They are poor, dirty, superstitious, funny, and sneaky enemies who live in the jungle and sing funny songs. Thirty-one neutral associations were Indians, Asia, Orientals, wear turbans, sheets, long beards, Mahatma Gandhi, Moslems, ghost, umbrella, Fakirs, and magic, always praying, hot country, and desert. Twenty-eight per cent of the reactions were "don't know."

TABLE 9

CHILDREN'S FAVORABLE AND UNFAVORABLE CONCEPTS OF FILIPINO FOR 1931 AND 1944

	Favorable 1931 14%		Favorable 1944 16%
1	Taught by Americans	1	Good fighters fighting Japs
2	Are great fishermen	2.	Loyal, gay
3.	Dress as we do	3.	Nice, kind, swell, O K
4	Romantic	4	Brave
5	Interesting	5.	Love freedom
6	Polite	6.	Musical
7	I like them	7.	Dancers
8	Have beautiful island	8	Simple people
9	Love sports	9	Some nice, some bad
		10	Good carvers
		11.	Good swimmers
		12	Always ready
		13.	Our ally
	Unfavorable 1931 26%		**Unfavorable 1944 13%**
1	Have dark skin	1	Dark skinned race
2	Wear little cothes	2	Wear little clothes
3	Dress queerly	3	Uncivilized
4	Live in mud huts	4	Look like small monkeys
5	Live in bamboo houses	5	Short, dark, ugly
6.	Build homes in trees		
7.	Have funny-looking houses		
8	Are very stubborn		
9.	Were once cannibals		
10	Have little knowledge		

Table 9 shows 14 per cent favorable responses to Filipino in 1931. They said the Filipinos are taught by Americans and dress as we do. They are great fishermen, are romantic, polite, and interesting, love sports, and have a beautiful island.

The 26 per cent unfavorable responses were that the Filipinos have dark skins, wear little clothes, dress queerly, have little knowledge, live in mud huts, live in bamboo houses, build homes in trees, have funny looking houses, were once cannibals, and are very stubborn.

Fifty per cent of the remarks were neutral Half of these were that they are under the United States government They exercise much, look like Chinese and Japanese, raise rice and fruit, and like bananas They have an easy life, the climate is hot, and the children go barefoot.

In 1944 there were 16 per cent favorable concepts. The Filipinos are good fighters, are our ally, fighting Japs. They are loyal, gay, nice, kind, swell, O.K., brave, freedom-loving, and simple people They are musical and are good dancers, carvers, and swimmers.

The 13 per cent unfavorable concepts said they are a dark-skinned race, wear little clothes, are uncivilized, look like small monkeys, and are short, dark, and ugly. Sixty-six per cent of the concepts were neutral. Most of these associations were Philippine Islands, also Bataan, Manila, surf riding, cigars, South Pacific, small and swift, look like Chinese, poor peasants, and misled by Japs.

SUMMARY

Association methods were used to study 12-year-old children's concepts and stereotypes of Polish, Irish, Finn, Hungarian, Bulgarian, Dane, Czecho-Slovakian, Hindu, and Filipino in 1931 and 1944 Many similarities were noted in the concepts expressed by the children during the two periods. Their ideas of Bulgarian and Polish given in 1944 were less favorable than those mentioned in 1931. Those of the Hindu, Hungarian, and Finn were also somewhat less favorable, in 1944 More favorable concepts were expressed about the Danish and Czecho-Slovakian in 1944 than in 1931. Many of the children's concepts show a reflection of the set culture patterns and stereotype of their social environment. The children's reactions indicate the need for intercultural education.

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EDUCATIONAL FAILURE WITH HIGH INTELLIGENCE QUOTIENT: A CLINICAL STUDY*

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A. THE PROBLEM

The material I wish to discuss here can best be introduced by presenting a clinical case which, though quite severe in its way, is of a kind commonly enough referred to us at the Child Guidance Clinic

Case 1 Derek, a boy of 14, was a fourth year pupil at one of the local secondary schools His headmaster asked us to see him on account of repeated spells of truanting The headmaster wrote: "For the past year he has been in the habit of running away for about a week at a time and returning for a few weeks, only to truant again" The School Attendance Officer had been put on to him but no lasting improvement was effected.

He was recognised to be quite intelligent, yet his school work was poor; he was put back from an *"A"* form to a *"B"* form with no benefit Several of his teachers commented on a lack of effort, and the headmaster reported: "He strikes us as a boy who could do well if he only put his mind to his work . . he is obviously miserable and seems unhappy both at school and at home" He was further described as "sullen and unfriendly, solitary and asocial" There was "no aptitude for games, and he gets out of them whenever possible"

A formal intelligence test[1] at the clinic confirmed his intellectual ability, for his *IQ* worked out at 130 He cooperated quite well in the test but at times he seemed withdrawn and inattentive otherwise he was slow and inclined to be perfectionistic, rarely risking a wrong answer

The report from school that "He is a most unattractive boy both in person, clothing, and manner" was borne out at the psychiatric interview His was a peculiarly unprepossessing appearance He was dirty and unkempt and in spite of a pair of new long trousers the general picture was that of an untidy tramp His hangdog and shifty expression added to the unsatisfactory impression he made on first sight

He had very little to say for himself, and his whole outook was blankly negative and retreating He tried to make out there was

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[1] The Terman-Merrill revision of the Stanford-Binet Scale is the routine one used at the Bradford Clinic

nothing wrong "I just don't like school, that's all." He could give no detail and would elaborate no reason, except "I'd like to leave school and go to work." This was his sole positive demand He had no idea what he wanted to do when he did leave apparently he had never given it a thought He rejected several suggestions of mine but could offer no alternatives. He had no plans, no ambitions, and also it appeared later, no cares When he truanted he spent the day knocking about town He could give no account of where he had been and his own expression "just messing about" was a fair guide to his character When pressed for a concrete reason for his unhappiness at school he broke down into tears

He did not improve on further acquaintance, for though he had a dozen treatment interviews over a period of about three months nothing was forthcoming on which to build a positive relationship Individual psychotherapy on conversational lines was all but impossible owing to his curiously blank detachment and the absence of any apparent aims or desires that he cared to express He had no spontaneous conversation, and attempts to get him to talk about himself brought little response. He would just sit slumped in the chair without much expression or comment, sometimes without a word or movement for as long as I chose to leave him uninterrupted In desperation I went so far as to take him out a couple of times to a nearby billiard hall He had said he liked playing and chose snooker, but he showed no signs of pleasurable interest Indeed he hardly spoke during the whole game, which like everything else he did, was indifferent, effortless, and slipshod. He was a little better when I put him in a preadolescent play group but even here he was mostly the onlooker and would sit about idly, or fiddle aimlessly with a toy or a bit of string

In the meantime as he realised that we at the clinic were not out to punish him, he became cheerfully unabashed at home and his truanting worse than ever. He took to pretending to bring homework back at night to deceive his father When he was found out and disciplinary action was brought to bear on him at school, he just absconded from home, sleeping out for several days. To all entreaties when brought back he repeated obstinately that he would do anything rather than go to school Finally he came out with the decision that he wanted to be a grocer's errand boy! He saw no reason against it nor why he shouldn't work his way up to being a manager!

The home situation was none too helpful. There was no woman in the home his mother had been dead since he was a youngster and his sisters were now married, he and his father ran the house together in an untidy sort of way. The latter, somewhat of a cripple, worked a bookie's business from the house. He was fed up with his son and was not prepared to go on pressing him to attend school. Under the circumstances the boy was given up as hopeless and was allowed to leave as soon as he reached 15.

(We heard later that after an abortive job at the mill he had settled

> down as an apprentice at a small "engineering" firm. He was given nearly half his wages as pocket money, but so long as he gave his father no trouble the latter was quite content)

It is very evident from this case and from others I shall quote later in this paper, that notwithstanding the great and undoubted value of intelligence testing in educational diagnosis, there are many other considerations which must enter into a prognosis of achievement, scholastic or otherwise. By their very nature intelligence tests seek to measure only a restricted aspect of the personality and that not necessarily the most significant. There was at one time a tendency to overvalue the intellectual side, but right from the beginning "other factors" have been noted greatly affecting performance. As far back as 1921 Terman (12), one of the pioneers in mental testing, wrote of "discrepancies between mental age and performance (at school) which cannot be traced to errors in rating. . . The quality of a child's school work depends in part on other factors than intelligence . . (on) health, regularity of attendance, *degree of application, attitude towards teacher, emotional stability, encouragement at home etc.*"[2] In his later *Genetic Studies of Genius* (1930) that same conclusion emerged when he found "A considerable number (of children of superior intelligence) were so lacking in ambition or ability to work consistently . . . that . . they remains content with inconsequential positions or drifted aimlessly from job to job."

A considerable amount of work has since been done on the nature of these "other factors"; on how to identify them and measure them. One of the main lines of research has been to devise tests for their assessment and evaluation in the attempt to establish a procedure analogous to intelligence testing. So far the results are meagre and not very encouraging. In a bulky volume Symonds (11) lists a large number of tests and scales but it cannot be said that any of them have really come into general usage like the Binet-Simon scale in its many modifications. One of the most promising is the attempt by Doll (4*a* and 4*b*) to devise a scale to measure social competence. Work with his "Vineland Social Maturity Scale" is being actively pursued by his pupils and colleagues in the U. S. A. In this country Bodman (3) is trying to adapt the scale for English children, but the procedure is in the experimental stage and is far from being established.

Clinical studies of individual children still remain the soundest approach to the subject, and in the problems referred to the Child Guidance Clinic one has adequate material for investigation. Most of the children, and all the educational cases coming to the clinic, are given a routine intelligence test which allows of a comparison between school work and intellectual capacity on test. I have picked out for this study a series of cases showing wide divergence between the *IQ* on test and achievement in school. Some were sent to us actually on account of a school failure recognised to be out of accord with their ability; others were referred for nervous symptoms and/or behaviour problems with school failure as a secondary symptom.

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[2] My italics

B. Classification

As a working hypothesis in classifying the material I have adopted the view that the *IQ* gives us a kind of measure of the intellectual framework *within which the child's more dynamic interests and urges are able to* function.[3] Where performance falls short to any marked degree of what *might be expected from the mental age, we must* look for other influences interfering with mental functioning. Such influences may depend on the pressure of circumstances material and social, external to the child: or they may be determined by emotional attitudes or conflicts inside the child's mind The latter more purely psychological conditions may be further subdivided to give five main groups in all.

1. *Cases Where the Disturbance is of External Origin*

These are the most obvious as a rule, and may be, but not always, the easiest to adjust An unsympathetic teacher, or antagonism from other children, or even the absence of adequate school friendships, may upset a sensitive child sufficiently to distract him from his work and prevent him giving his best. *More commonly the disturbance originates in the home, where there* is an almost infinite variety of actual situations to be encountered. It is *my experience that poor material home conditions do not figure* largely *in* the determination of severe cases. Even where there is definite poverty one usually *finds a* faulty psychological *atmosphere* which is *the prime* source both of the poverty and the child's problem. The many kinds of unsatisfactory home background tend to crystallise round two extremes: a general indifference to the child's progress with absence of any ideals or standards of performance, and curiously enough the very opposite, over anxiety and over pressure for scholastic and other achievement There is also of course the worst of both worlds: serious disagreement between the parents on the line to be adopted.

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[3] Before I embarked on this enquiry I did think with Susan Isaacs (5' p 25) that "The *IQ* sets as it were the upper limit beyond which we cannot teach the child" But I have reason to believe now that there are circumstances where a child's performance can in a way transcend "the limits" set by his *IQ*. See Case 14.

2. *Reaction Character Formations*

Unsatisfactory external conditions during the early years are always liable to have a permanent imprint on character. The effect is more obvious where instead of being overawed into conformity the child has been resistant or even defiant. Reactions to, or rebellion against, unwise handling at home or at school become internalised and ingrained in the child's character and show as a rebellious attitude to all authority, or a resistance to learning in general. Mere manipulation of external conditions is now no longer enough to settle the problem, there has to be some change effected in the child as well.

3 *Infantile Neuroses*

Emotional conflicts engendered in the manner as above may become introjected, and in suitably disposed subjects set up clinically recognisable neuroses interfering with the learning process. Most commonly one sees infantile Anxiety States of the hysterical retreating kind, less often Obsessional Neuroses.

4. *Defects of Character of Constitutional Origin*

Besides those arising out of temperamental defects, there are the delays and limitations of emotional development. There is on particularly interesting and important type of this latter, of not infrequent occurrence and of serious import, which I would call the "emotionally infantile" I will give examples later.

5. *The More Severely Abnormal Psychopathic States, Up to and Including the Psychoses*

I mention these for the sake of completeness but I will not go into them in any detail in this paper. There are of course no such clear lines of demarcation between the various groupings, and most cases show a mixed derivation. In practice one does not ask "External causation *or* internal conflict *or* constitutional defect?" but "To what extent is this problem due to factors which press on the child from the outside? How far have the conflicts engendered been internalized? How much of the difficulty is constitutional? And of what kind?" On the answers to these questions, which may not be so easy to arrive at, depends the precise diagnosis and treatment.

C. Clinical Case Material

I will now describe briefly some examples selected from my records at the Child Guidance Clinic and elsewhere, illustrative of the various groups of my classification. As a good example of Group *A* take:

1. *Case 2*

Boy with antipathy to secondary school derived from step father situation.

> James, aged 13½, was referred for truancy. At the high school he was attending (on a scholarship) he was at the bottom of the class and was thought to be just dull. The staff all reported that he was lazy, apathetic in his work, and untidy in appearance. His *IQ* on test however was 119. He was slightly deaf from an old mastoid, but this did not bother him much, and the boy himself was sure it was not the reason for his being behindhand at school.
>
> He said he was "Fed up of school . . . can't do the lessons . . . it's no good I've tried and I can't take it in." (Especially maths where Mr ——, the teacher, *won't help him: this with a hint of tears.) He admitted* he had given up trying now and was making no effort to do his homework for example. He wants to go back to W—— Modern School.
>
> There was nothing abnormal in the boy's character. His mother found him a good boy at home, responsible, helpful and obliging, and he got on well with his brother and half sister. But she told us of her second marriage after James' father died. She is very much afraid of her second husband, a man some 10 years older than herself. He is very difficult to get on with and she is dreading his impending homecoming from the army after four years service in India. He was only interested in his own child and had no time for James. He had been opposed in the first place to the boy taking up a scholarship and going to the high school.
>
> James was well aware of his step father's attitude and was in no doubt as to what would be said about his school failure when father came home. He reciprocated with an openly expressed hostility, to which he added, "I am only waiting for the day when I can get to work out of his way." One had no need to look any further to find the source of the boy's almost obsessional anxiety to leave school and consequent loss of interest and achievement. The deafness may have played some part, in that he had a great deal of trouble with his ears during the first few months at high school, necessitating frequent absences. It may have been the first step in his falling behindhand, but the over-riding consideration, and what kept the problem going, was certainly the antagonism towards his step father and the fear of his criticism.

The majority of "situational" cases are not nearly so simple. Usually, in addition to the problem at home there is some element in the child's character playing into the situation, the two fitting hand in glove Most cases appear somewhat like this next which can be looked upon as a halfway house between Type *A* and Type *B*

2 *Case 3*

Boy submitting completely to dominating mother and losing all initiative in the process.

Peter A , at 12, was referred from the high school to the clinic for being "an intolerable nuisance in the class room" In addition he was a complete scholastic failure, for after being kept back a second year he was still at the bottom of his class some of his subjects were reported as "unmarkable" The headmaster who sent him gave as his opinion that he was not up to standard and should be removed When we reported our finding that the boy had an *IQ* of 126, and explained what it implied, we received the stinging reply that after 20 years' teaching experience we could not be expected to tell him his business. "I know a fool when I see one . this boy certainly is one and an idle one at that."

Peter was a pale weedy youth, docile, very mild-mannered, and over polite He agreed readily with every suggestion, or alternatively said "I don't know," in order to avoid having to think. He was an only child His father, a policeman, was a quiet and retiring person and his mother, a houseproud rigid woman, undoubtedly wore the trousers. She took great satisfaction in the way she had disciplined Peter from the beginning. She used strict "Truby King" methods of training and told us proudly that "he spent hours on the pot" So he did, probably in silent rebellion, which as he grew up developed into an untidy indifference to household rules which kept showing through his meek and placid exterior His mother told us how much trouble she had to make him wash his hands, clean his shoes, put things away, etc She seemed to spend her time following him around, doing these things for him but nagging him about them As a result he developed a casual "don't care" attitude towards his mother's exhortations He told me once in a burst of confidence "Whatever you do for mother is wrong, so why bother"

At school where his mother was very anxious for him to succeed and "Do better than father" he was more careless than ever He was quite satisfied with any performance however bad He once grumbled that he had a sum marked wrong when the answer was "only twenty out"!

His complete submission to, and dependence on, his mother had rendered him devoid of all initiative or real ambition He tended to retreat from any situation of difficulty especially if it needed independent thought or action His only spontaneous activity was to play the fool in class which probably gave him some compensation for outlets denied elsewhere

He needed a long period of treatment before he showed any im-

> *provement* at all in his attitude Betterment at school was slower still, and in spite of his comparatively high *IQ* he had to go back in the end to a central school But though delayed in its appearance treatment seems to have had effect in the long run Several years afterwards he wrote to me from the R A F. to tell me he had succeeded in getting his wings as a pilot. In the long letter he sent he told me of several organisational jobs he had undertaken voluntarily and carried through successfully Later still he wrote me on getting married He described himself as completely changed and attributed the change to his conversation and experiences with me at the clinic, which, he said marked a turning point in his career I could not help but wonder, however, how much was due to his living away from his mother for the first time in his life

3 *Case 4*

> An unresolvable hostility between father and son, an actively rebellious kind Kenneth, aged 13, was sent to me for persistent stealing He was doing indifferent to poor work at school although his *IQ* was 141! His stealing was to some extent neurotically determined, being related to jealousy of a younger brother for whom his father showed an undoubted preference Mr. ——— had taken up a harsh intolerant attitude towards his son's failing, to which the boy replied by being cheeky and defiant, alternating this by feelings of remorse and unavailing attempts to placate his father. The effect of these emotional disturbances was to prevent him using his very high ability to anything like capacity. Kenneth confessed during treatment that his stealing, as well as his comparative school failure, gave him a certain amount of satisfaction in that they upset his father. Treatment was unsuccessful I was unable to bring about a change of attitude on *either* side, the boy's or the father's

4. *Case 5*

A rather more complicated case of mixed derivation and with some neurotic symptom formation is shown by Case 5, an only child with serious parental disagreement and open family quarreling.

> Marjorie, aged 12½, *IQ* 130 She was recognised at school as intelligent but she was reported as not working up to capacity and gradually losing ground. Recently she had several "fainting attacks" whilst in the school assembly The headmistress knew something of her unsatisfactory home background, and seeing the girl's unhappiness sent her to us for advice
>
> She was an only child of parents completely at loggerheads with one another, and she with both of them. The resulting triangular situation worked out somewhat as follows.
>
> Father, a professional pianist, set some value on culture and education. He was bitterly disappointed in his wife whom he blamed for

hampering his own career In compensation he had pinned his faith on his daughter and had visions of her becoming another Myra Hess. When she refused to learn the piano he reduced his ambitions to her becoming a school teacher He is annoyed now at her school failure and wants to blame his wife for that too!

Mother was most to be pitied. She was an invalid with a hemiparesis following a stroke. The trouble between her and her husband crystallised round the domestic finances He gave her little enough for housekeeping and then complained that he could not entertain his colleagues at home Besides being erratically temperamental, his general behaviour towards her was to make her as downtrodden as possible, and then jeer at her for being a slut He would do this in front of his daughter who lost no time in following his example, and even improving on it Marjorie was rudely impudent to her mother to the extent of ordering her about and abusing her for not being quick enough.

In spite of father's ambitions for his daughter and his grumbles about her lack of progress, he petted and spoiled and indulged her, sometimes it would almost seem to spite his wife Marjorie exploited the situation to the full, she would do nothing in the house unless paid for it, and enjoyed stirring up trouble between her parents for what she could get out of it. Her selfish callousness stood out as the one point on which her father and mother agreed.

None the less, and not unnaturally, Marjorie was at bottom very insecure and unhappy It was noticed at school that she shirked difficulties, indulged in a good deal of attention-seeking behaviour, and was often caught day-dreaming (Her diary was found to be full of pseudo-precocious notes on film stars and details of face creams and lipsticks, etc) She was more perturbed about her school failure than she cared to admit, though she put a good face on it at first, she was soon near tears when I probed her further in the treatment interviews. After breaking through her early suspicions of the clinic's intentions she gave vent to a good deal of ambivalent feelings towards *both* her parents. Alternately she sneered at them and wept She hated her father and despised her mother and then she cried bitterly because they made her the subject of their quarrels In front of her too "I'm not so bothered about their quarreling but they shouldn't do it in front of me I've read that in lots of books It shouldn't be allowed"

She had many conflicts to ventilate and much extravagent fantasy which she went through during a course of individual psychotherapy running over the best part of a school year (About twenty-six sessions in all. Her mother was also seen concurrently) Our last report on a follow-up was of improvement at school where she had been promoted from a *"C"* form to a *"B"* form and was doing well There were no more neurotic symptoms and according to the headmistress "she is less obvious in the form though still Marjorie!"

There was a concomitant improvement in the home situation brought about by our efforts with the mother She was able to stand up to both father and Marjorie better It looked at one time as though she would carry out a threat to leave them, but this did not materialise and an adjustment, albeit precarious, was arrived at

To move right over to the *second group*, the Reaction Character Formations The commonest picture is that of an obstinate child reacting adversely at some stage to temporary external difficulties with a response continuing long after the need for it has passed and which gradually becomes embedded in the general character If seen early enough before the change has become too set and rigid, adequate treatment can give good results, though it always takes time.

5. *Case 6*

Child developing negativistic character with denial of affection Doreen, an attractive young girl of 10, had just entered high school. Her mother brought her to the clinic because of two short spells of truanting Doreen's excuse was her dislike of the form mistress for shouting at her But at the school it had already been noticed that she was not working very well and her general attitude was described as "passively resistant" and lacking in effort As estimated by her homework she was at the bottom of the class Her *IQ* on test was 123

Mother described Doreen as always "stubborn and wilful and taking criticism badly" She is very unwilling to help though she demands as much affectionate attention as her better-natured younger brother of whom she is jealous The behaviour problem had not been too serious to be managed however until some two years ago when her father was called up and mother went out to work Mrs. ——— recognised that overwork made her less able to control the situation at home and she was beginning to lose her temper with Doreen. The latter, when reprimanded, had taken to emptying her mother's things from the drawers and tearing them After a quarrel with her brother she would destroy his toys too

Doreen was rapidly developing a negativism which showed up strongly when she was in trouble. She would never say she was sorry, and as I found in my first interview, her defense was to adopt a peculiarly hostile kind of silence Later on in group play treatment she revealed her basic psycho-pathology She showed herself to be selfish and possessive, and attempted to boss both the others in the play group and myself. On the other hand there was her appetite for affection as noted above with her mother. To solve the resultant internal conflict she was trying hard to reject the need for affection as a vulnerable weakness She had even gone so far as to refuse *all* friendly advances from anyone, and protected herself by the passive hostility already mentioned This was the meaning of her negativism about which I found her not nearly so self-assured as at first seemed likely There was still a marked ambivalence present she alternately

> cheeked and defied me, almost inviting opposition and doing everything to provoke it, then came snuggling round to be fussed over She was distinctly ill at ease about expressing the affectionate side of her nature and very much disliked the other children noticing it
>
> About 20 sessions of treatment spread over some six months made an amazing difference to the child's behavior at home, much to the mother's relief. There was no further truanting from school She was reported from there as more responsive but with a tendency towards passive resistance still in evidence

A similar case in a somewhat older child had a rather transparent origin but for all that was not too easy to put right, this latter a common enough experience in clinical work.

6 *Case 7*

> Early school mishandling causing persistent behaviour problem in later school life Joyce, not quite 13, had an *IQ* of 124 She was referred to us by the Grammar School with a complaint of "mulish refusal to tackle and make progress in certain subjects" the chief of these being mathematics If she liked a subject she would work at it, but if not "All round the staff find her attitude often so very resentful" wrote the headmistress "There is a general feeling that the girl is not with us, and is decidedly a problem
>
> Mrs X agreed that Joyce was not progressing as she should at school and told us of tears over mathematics homework There was however this very significant history. She began at the elementary school at four and a half quite happily, but in the second class (aet 5-6) the teacher insisted on "correcting" a left handedness against all advice Joyce's reaction was violent She would not eat or sleep, called out at night, and not unnaturally did not want to go to school Even in the third class the teacher found her a "proper dunce" and was rather down on her She soon got a bad name for being in mischief which presumably she lived up to The elementary school headmistress was very surprised when she won a scholarship to the Grammar School
>
> The referral complaint showed that the girl's suspicious hostility towards teachers had not disappeared with the change of school even though, as she admitted, she liked being at the Grammar School and was allowed to revert to left handedness In conversation one learned of her extreme sensitiveness to the personality of the teacher For instance a change of teachers (for the better) in French in her second year at the Grammar School had made all the difference to her approach to that subject Mathematics however remained persistently bad, she was very conscious of her failure here, commenting "I try awfully hard but it's no good, I don't seem to be able to take it in."
>
> There were other complicating factors which went to maintain her touchy awkwardness at the secondary school Both she and her mother showed decided social inferiorities on account of their comparatively

poor economic position. At the beginning Joyce had not got on at all well with the other girls: she found them "a bit snobbish" She was not a good mixer anyway, and had always leaned heavily on her father for companionship The latter was now in the army and for a time she felt quite lonely Her inability to get on with people was quite a sore point with her Several times during treatment we had tears about it, and she confessed at one stage that she tries to feel she doesn't care when she does really

Treatment, though protracted, was successful in the end. In addition to regular weekly sessions for the best part of a year we kept in touch with her and saw her at intervals for a long time afterwards. It was a great day when quite spontaneously she came to tell us proudly that she had passed her School Certificate

Not all cases have so happy an outcome. far from it, as I shall indicate later. But the children in the next group, those with simple Anxiety States, are particularly amenable to treatment and will repay any time and trouble spent on them. There is rarely any behaviour problem; usually they are described as model children and often as *too* good, even by teachers and parents. They are noted to be overconscientious, but subject to anxieties which prevent them giving of their best They are referred either for definite nervous symptoms or because of the effect of their anxieties on school work.

7. *Case 8*

Typical Anxiety State in a highly intelligent young boy David, aged 9½, was referred for lack of concentration and backwardness at school His *IQ* was 151, a level only reached by one in a thousand, he should have easily been top of his class. In the psychological test he was very tense and punctilious and afraid of making mistakes There was no overlooking the nervous tension interfering with his school learning Other evidence of neurosis was forthcoming in his frequent nightmares and a nocturnal enuresis which had only just begun to disappear

He came from a good home where there was apparently nothing to worry about But our enquiry brought out that he was the baby in a family where extremely high moral standards prevailed. One of the complaints against him was "lack of responsibility!" It transpired that three months previously in a childish prank he had "stolen" some ice cream. for which he had been lectured by all the members of the family who felt that the stealing was such a disgrace to their name

The boy was by nature of a lively and cheerful disposition and probably easily in mischief But sensitive to the extreme moral tone of the home, well demonstrated in his mother's solicitous fussiness, he was trying hard to control these wayward yet naturally boyish impulses by being rigidly over correct. His fear of failure, in this as in regard to his parents' ambitions for him generally, was the source of his anxieties, which by interfering with his concentration and attention at school defeated their own ends. I did not see the boy for more than the diagnosis and so cannot say what happened to him, but this next is a case taken on for treatment

8 *Case 9*

Intelligent girl with simple Anxiety State inhibiting school performance. Betty, aged 12+, was referred for "poor work at school—over anxiety—nerves—dreaming" She was thought to be of about average intelligence in school work she was at the bottom of the class

Both parents came with the child to the clinic which they were consulting on the advice of the headmistress They were comparatively well-to-do refined people and needed much reassurance that it was quite usual for children to be referred to us from secondary schools Mother in particular was anxiously overprotective and asked fearfully whether treatment would bring "all Betty's beautiful dream world to the ground"

According to mother, "She had always been slow—dreams all the time. Normally is rather *too* good and sweet—very considerate of others" Her nervous symptoms include fear of the dark and screaming in her sleep.

The intelligence test gave her an *IQ* of 134 with the following comments on her method of working "Very slow reactions! Difficult to tell whether she is thinking or has gone off into a dream Anxiously persistent when in difficulties. Very erratic performance Poor on number work but excellent vocabulary and language attainment."[1]

At the psychiatric interview the girl was seen to be a gentle well spoken child with an attractive grin but tell tale "bags" under her eyes. She was quite disturbed about her school failure "All my reports say I don't work hard—but I do" She was very self critical too for example she rejected what I considered was quite a good drawing of a horse for an attempt to do a better one All her drawings, and throughout the treatment, were of horses and nothing else She had an all consuming passion for animals, horses particularly In school, about which she was delightfully outspoken, she said that when she did not like her lesson she would sit and day-dream about horses Her ambition was to be a "Vet" and although she admitted that seeing dead animals or even hearing of cruelty to animals upset her, she was sure she would not be deterred by this

In general she was timidly feminine, but she had a bolder tomboy side to her character Her mother does not approve of some of the games she plays, e g, climbing trees, and lectures her for it apparently on alarmist lines, e g, she might fall and break her neck.[5] Betty agreed that her mother was fearful about many things which had made the girl herself afraid for instance about crossing the road

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[1] This last is a characteristic finding in overprotected children of over-anxious mothers See Levy (7, Ch. 5)

In spite of the child's easy charm of manner one noticed her turn her head away in conversation as her appearance altered completely from the usual bright grin to a worried frown She told me "lots of things" worried her, and she gave me a list of simple situations which made her very anxious (from shortage of food for her guinea pigs, to going to catch a train) Her dreams were of funny frightening shapes jumping out of the bed, monsters and all that then she wakes up screaming.

The diagnosis of "anxious child with over anxious parents" was well established The girl's poor performance at school was chiefly due to her neurotic anxieties, though her overriding interest in horses into which she retreated when she disliked academic work, was an aggravating factor Treatment consisted of free play in a small group with two other girls. It was more than usually effective, for it cleared her anxiety symptoms after about four months (16 sessions) The latest school report showed distinct improvement, viz "Her work is satisfactory and a greater steadiness has become evident in her conduct lately" She was however still in a form lower than her age group

9 *Case 10*

A somewhat similar case in a boy but with a larger element of retreat Stuart, aged 12, came to us through the family doctor who had some time previously attended his father for a "bad nervous breakdown." The boy himself was under treatment for "nervous indigestion" when he expressed himself as unhappy at school and began to truant Whereupon the doctor sent him via the school M O to the clinic

According to his mother he has always been an insecure boy, never quite sure of himself She described him further as soft[6] and sensitive He pulls away from any unpleasantness and in general does not stand up for himself at all In many ways, for example in boyish mischief like climbing, he can be courageous and adventurous, but he is distinctly afraid of meeting people, being very bad with strangers

The secondary school found him nervous and unable to concentrate, lacking in self confidence and very reserved His homework was poor and irregular and his work generally unsatisfactory He was put down as "average to dull" in ability, and was variously thought to be "lazy" or . "lacking in energy"

His *IQ* on test was 120+ In answering test questions his insecurity and lack of confidence showed prominently in the continual elaboration of his answers as he sought for approval The following extract from the first psychiatric interview points to the diagnosis.

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[5] Mother accused father of being both *more* strict and *more* alarmist!

[6] As opposed to hard or tough (cf William James' tough and tender types)

> *(I hear you don't like school?)*[7]
>
> "That's not why I ran away. I was late in the morning then I didn't like going in. . . . When I didn't go to school I didn't go playing like other boys. I just stood outside the school. I daren't go in." From his description I gathered he was just petrified with fright. He expected a row and was surprised later when he was only mildly admonished.
>
> *(Is there anything the matter with school or is it you?)*
>
> "It's me." He gave a worried frown and went on to recount several anxiety dreams. One was, "I was back at school and the teacher was caning and caning and caning. . . ." Another was of "falling off a high tower into some water." (There were other elements in this case which gave it the structure of an Anxiety Hysteria but they do not concern us here.)
>
> Treatment followed the usual lines with marked improvement after about 20 sessions spread over six months. He removed to a nearby town towards the end of the course, and contrary to his previous reactions to changes and strange situations he settled easily at his new school. When last heard of from his mother he was much happier at school and finding no difficulty in making friends. "But he will not face up to anything that will give him the least discomfort; for instance he could not be persuaded to go to the dentist to have his teeth seen to." His end of term report was indifferent except for Art and Handicrafts at which he excelled. The general comment was "Could do better," and to quote his mother again, "He certainly lacks that push for himself that is necessary for him to become some good."

Anxious children like the above are found at primary schools also, where their educational backwardness may cause the teacher to suspect mental defect.

10. *Case 11*

> An extremely insecure boy of nine, unhappy almost to the point of depression. Keith's parents were concerned about his very poor school work and his nervously erratic behaviour in general. Educationally he was very much retarded. Reading was worst being not up to the six-year level. Arithmetic was a little better but confused and erratic. Yet his overall *IQ*, by the Terman-Merrill, was 95.
>
> He showed much evidence of massive neurotic conflict based on a very pronounced underlying insecurity. He had always clung dependently to his mother and at one time had to be taken with her wherever she went. Even now whenever she goes out, he asks anxiously to know where she is going and when she is coming back. For symptoms he had various fears, and peculiar restless squirming movements which made him very clumsy with his hands.
>
> There was the usual good response to treatment confirmed by a follow up two years later which showed him to be doing "reasonably average work for his age." He was still somewhat erratic in his behaviour.

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[7] Expressions in brackets are the questions or comments of the psychiatrist.

Occasionally even in preadolescents one comes across severe, fully developed psycho-neuroses very much like those seen in adults, which can prove extremely difficult to handle One girl of 13+ approximated to a gross Hysterical Psychopath. She attended the clinic for many months using it chiefly as a means of avoiding school; when any pressure was brought to bear to get her to school, she just took to her bed Another case I will give here briefly to show the lengths to which one may be committed in treatment

11 *Case 12*

A boy of 12+ with a deep obsessional neurosis My opinion was sought privately by the parents of Geoffrey X who were perplexed by his very erratic performance at school which made them doubt his fitness for a professional career I was able to reassure them somewhat when a test gave him the formidable *IQ* of well over 140. He was however distracted by numerous obsessional rituals of a highly compulsive nature about which he was secretive and unhappy He was considerably helped by a course of some six months psychological (play) treatment during which, though not without difficult resistances, he unburdened many of his "wild imaginings" to his great relief As soon as he was doing better at school, treatment was terminated, though it was noted that both his improvement and insight were very limited.

Just over a year later he came to me again, this time *at his own request*, for more treatment By now he was much more cooperative and he made considerable progress' enough to enable him to pass a good School Certificate standard A few months afterwards—he was then just over 15—he wrote me a letter setting out his emotional problems in detail and intimating that he was now ready for a "radical settlement"! The upshot was his being taken on for a formal analysis (which he knew all about, having read it beforehand!) which extended through the next two Higher School Certificate years and was continued even after he entered the University, where he ultimately qualified in law

So far the cases have been treatable, and with fair prospects of success But when one comes to the third group, the more constitutional types, to which I should like to turn now, one finds them much more intractable and their character less amenable to change More often than not one has to bow to the inevitable and reduce the situation to meet the child's limitations.

12 *Case 13*

A highly intelligent girl with temperamental defects of character Joan, aged nearly 14, was recognized at school as being very bright This was confirmed when we found her to have an *IQ* of 144 But "She handicaps herself by carelessness and slackness, loses interest, is too easily discouraged, and makes little attempt to tackle work she

> finds difficult" Other complaints were of "an evasiveness and plausibility in giving excuses which amounted to lying" She was unpopular and had only one friend who, in the opinion of the school, was not good for her One teacher summed her up as "She has some fine qualities but there is no apparent cohesion—no binding principle"
>
> This estimate of her personality was confirmed by her mother who added to it that she was impulsive and lacked persistence "She is always looking for excitement and the limelight She loves acting and is not a bit self-conscious She is very vain about her appearance" On more than one occasion she has gone in for beauty parades locally and once she won a prize of which she is inordinately proud.
>
> Her basic failing became apparent in the several psychiatric interviews I had with her She showed up as a slap dash, happy-go-lucky tomboy, flighty, erratic, and irresponsible. She had plenty of insight, viz "I get fed up quickly and don't finish things—(and apropos of knitting) "I get a craze then I stop halfway" She agreed she was rather bored as a rule and would do anything for excitement which, she admitted, interfered with her school work But when it came to the point she was not prepared to make any effort to alter Apart from a momentary qualm when tackled about her failure she gaily pursued her immediate pleasures with hardly a care I saw her only about half a dozen times without much effect I fear, and as the family left the district we lost sight of her

Temperamental qualities, insofar as they affect one's interests and modes of working, must always affect performance to some extent, for better as well as for worse It is in fact these very temperamental variations that make for different interests and aptitudes, the appropriate encouragement and stimulation of which forms the basis of good teaching. Fortunately it is not very often that one comes across cases like the above where an unsatisfactory temperament plays such havoc with so high an intellectual capacity. In the cases I have seen, it is my experience that there is no particular scope for special psychiatric techniques, and though ordinary teaching may not have been successful to date, one must continue the usual, or even unusual, educational pressure as the only means available and hope for some better response as the child becomes more mature

The next case is a digression for a moment from the main theme of this paper for it is the very reverse of Case 13. Scholastic success was attained in spite of an inadequate intelligence level because temperamental conditions were favourable and the situation demanded it How often this happens I cannot say. Children who are doing better than might be expected of them are of course not referred to us unless for incidental problems I quote it here however as further evidence that intellectual ability as measured on test, whatever it may prove to be, is not a completely rigid framework and that ultimate performance depends on emotional factors more than is generally accepted. It would seem that given sufficient incentive one can in a sense even transcend one's intellectual limitations.

13 *Case 14*

Boy with comparatively low *IQ* whose scholastic success was gained through obstinate persistence fed by jealousy. Ian was sent to us at 13+ for stealing. He was an unhappy chronically dissatisfied boy with real inferiorities which he was trying hard to overcome. For instance, with an *IQ* of only 102, he was not really equal to a high school education though he had been attending there for three years. But our obvious suggestion that he should leave to make things easier for himsef he resisted strongly. He was very jealous of an older and more intelligent sister who was held up as an example to him by his mother, and he was determined to do as well, or even beat her. This came out in conversation when I asked him what he was going to be when he grew up.

"I want to be a doctor."

("Is that to be as good as your sister?")

"She wanted to be a masseuse so I wanted to be something like it."

("You wanted to go one better?")

"Yes" (with a grin of satisfaction)

He told me he was tired of hearing how good his sister is and instead that he could do his work just as well as she had done.

Owing to a relapse after his first spell of treatment we kept contact with him right through his fifth year at school. To everyone's surprise, the school included, he passed his School Certificate with four credits.

There is another way in which emotional factors interfere with education about which little to my knowledge has been written yet. I can best describe it as follows. Just as one has physical growth, so one has intellectual development, each distributed in a different way throughout the population. There is yet a third quality, emotional maturation, which also varies considerably from person to person, though as it is not measurable in quantitive terms its exact mode of distribution remains unknown. With its far-reaching bearings on the integration of personality, it is a quality clearly of considerable importance in education.

Paradoxically, though not too surprisingly when one thinks about it, it gives rise to difficulties at both ends of the range: with the overmature as with the immature, though in very different ways. This is how it appears with the overmature

14 *Case 15*

A near-adult girl with no interest in school Sheila, aged 14½, was a scholarship holder at the secondary Grammar School quite in keeping with the *IQ* of 129 found later on test She was in the pre-School Certificate form when the headmistress, asking us to see her, wrote

"We feel we are not getting anything from the girl We have tried encouragement and severity with no apparent result. There is an evasive quality about everything she does," Her attitude to the teacher was described as "polite and resisting" It was felt that even in play she could do better There was nothing they could see at school to account for it

Her appearance when she came for examination at the clinic was quite overwhelming She was a very pretty girl tastefully dressed as a near-adult complete with face make-up, which as my psychologist (female) acceded, was very skilfully appied. She looked mature, posed and confident, practically a young woman, at any rate more like 19 or 20 than under 15 Her interests were in keeping with her appearance She liked sewing, knitting, domestic work, and dancing Up to the age of 10 or 11 she had ambitions to be a teacher, but this has quite gone now She appreciates she could do better at school but finds it difficult to maintain any interest For example she "hates history," paid no attention in the lessons, and got 10/200 in the exam She did not even do well in domestic science

She is prepared to try and overcome her previous slackness and to work for school certificate but nothing beyond that She will be glad when she leaves school "It gives you more time to do things" (for instance knitting, going out with her young man, and matters domestic and social generally)

She wants to go out to work with people, preferably with her mother who is a clerk at the Labour Exchange

Her mother's account of the situation was completely corroborative There was no difficulty at home and the problem was entirely limited to school Her rapid sexual maturation was recognised (she began menstruating at 11) and accepted Though not without some trepidation on her parent's part, she is allowed to go out with her boy friend, and altogether given most of the freedom that her maturation seems to demand[8]

Her further history was that she failed in her first attempt at School Certificate. Then, much to the headmistress' surprise, she stayed on to take it again, this time quite successfully and with three credits

More interesting from the point of view of psychopathology but much more difficult to deal with, are the immature, especially those introduced into this classification as the Emotionally Infantile. One comes across the type very often when dealing with persistent and recalcitrant delinquents, usually combined with low intelligence, but the significance of the condition has not to my knowledge been adequately appreciated. I should like therefore to give two typical examples in Secondary School boys where it is associated with a high *IQ*

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[8] I had a reply from her in response to a follow-up in which the postscript read "I *did* enjoy my last dance"

15. *Case 16*

An erratic, emotionally infantile boy unable to apply himself seriously to school work. Thin veneer of social conformity Peter *B*, aged 13, was doing very badly indeed at school In general he was described as lazy, inattentive, and incapable of concentration. this applied both to his work and to his (organised) play In addition there were complaints of his restless chattering in class. Several masters reported that he made himself a nuisance in this way, and one noted that he was so busy talking to his neighbours that he had not *started* his written class work by the time the others had finished He was variously given as unresponsive, not impressed by disciplinary measures, and even resentful at times. He had no friends amongst the boys in the form.

His intelligence quotient was 119. He was a curiously slow worker with an easy retreat before anything difficult.

At first sight he had much in common with Peter *A* (Case 3) Here also there was a severe rigid mother who had brought up the boy on strict Truby King lines, which as he grew older was continued in repressive social discipline. His mother was very proud of her ingenious punishments. For example if he'd chopped no wood she would not light a fire for him. or if he refused to go an errand she would tell him of the things she *would* have bought him if he had gone. As for school, she was ambitiously pushing him all along and left him very little chance to develop of his own accord

On first acquaintance the boy showed Peter *A*'s impassive emotionless exterior with the same mechanically correct behaviour; his correctness in conversation bordered on intellectual priggery But there the resemblance ended Underneath his mask this boy had quite a vivid imagination and a strong streak of restless energy When these were uncovered in a free play group at the clinic, the psychopathology of his school failure became painfully clear He very rapidly dropped his covering of rectitude and just went wildly silly in erratic and scatterbrained play at a most childish level. Many patients have a phase like this which they work through during treatment Not so Peter *B* who continued with but little change over the year and more that he attended the clinic When towards the end I took him up about it, his reply was "I haven't played out my babyishness yet!"

He had curious islands of insight of this kind For instance he carefully differentiated his babyish play at the clinic from his social life outside Just occasionally one saw constructive elements in his play, but not for long Even when he was trying to behave, as he said he was at school, he could never maintain interests appropriate for his age for more than a very short time, and when his control broke down he was quite silly. He was well aware of this weakness himself and once asked for someone to stand over him and "make" him do his work

This is exactly what his mother was doing at home but the only result was the (rather thin) crust that showed on his first appearance. He was completely dominated by his mother of whom he went in fear and trembling. It was quite startling to see his expression once when he unexpectedly ran into her just outside the clinic door after a wild play session quite suddenly his whole bearing altered and the old mask of humility at once dropped over his face

Attempts at individual psychotherapy were handicapped by the same reaction and were quite unproductive. Being conducted on verbal lines they simply showed up his intellectual insight but hardly affected him very deeply It was always difficult to say how much of his understanding was pious talk only He took his mother's iron discipline completely for granted and had not a word against it. He blandly admitted that he deserved the hidings he got even when she hit him with a stair rod[9] He meekly accepted the various domestic jobs he had to do to earn his 6d. a week pocket money He defended himself (verbally) with "At any rate she doesn't spoil me" He thought his mother was quite right to make him wash up and clean the house "After all she has been at work all day" These proved to be no more than rationalisations of his fear and submission He was continually afraid she would withdraw his pocket money and he admitted that he had been thoroughly scared once by her threat to send him away

Fundamentally, as became more and more apparent with the lack of progress in treatment, he had no real conception of personal initiative or responsibility. Nor did we find it possible to develop one in him, when pressed he would repeat his request that we should *make* him work. On closer familiarity with us expressed more and more self satisfaction and showed his standards of successful achievement to be deplorably low At bottom he blamed others for his failure and could not see how he could help it himself. His conduct did improve a little but his school performance continued as bad as ever We had to agree with him in the end that only pressure from the outside would make him take anything seriously and on our advice he left school at 14+ to go to work at the Post Office as an errand boy

16 *Case 17*

Infantile, cheerfully irresponsible character with high *IQ* Trevor, aged 12, looked every bit "the fat boy", one could quite understand his being made a butt of at school. His work was poor and he was bottom of a "D" class "He seems to find the work hard but always gives the impression he could do well if he could concentrate," wrote his headmaster Unfortunately quite on the contrary he was "careless, sloppy, inattentive, and forgetful"

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[9] This was the boy's statement and we did not check it

He was an only child His father, who for the past five years had been in the services, was found balanced and sensible, but his mother was fearfully anxious to the point of neurosis She admitted that she has always depended excessively on her husband and whilst he was away constantly worried about him not coming back She described obsessional fears, of illness chiefly, and what amounted almost to a cancer phobia She was very much wrapped up in the boy towards whom she showed herself fussily overprotective Many of her fears of illness she had projected on to him causing much unnecessary restriction of his activities. She recognised his babyish behaviour yet she knew he was intelligent and blamed herself for spoiling him

He had an *IQ* of 132, his vocabulary was particularly impressive, being up to superior adult II standard But his outlook was one of cheerful irresponsibility and he was hardly concerned about his school failure. "I'm getting on better at school there was a lot of bullying . . they used to stick pins in me and hit me for nothing . . it used to interfere with school work . but I can do a lot better now"

He gave details in a very matter of fact way without any ill feeling, even whilst talking his eyes were roaming around the play-room and he was anxious to be exploring its possibilities There was some initial guilty feeling about his infantile behaviour for instance he hesitated before going on the rocking horse "Are there many other boys ride the rocking horse? How old are they? Are they over 12?" But he soon overcame it He was very much taken up by the freedom given in the clinic play room and was extremely but erratically active He had imagination, which at times he used intelligently, but he could never keep it up. He completely lacked the capacity to persevere at anything, and his infantile flitting with a flow of talk to match, was round about the level of an intelligent four-year-old No wonder he was restless and slap-dash at his work.

A good example was his play with the typewriter He loves typewriting, he said. But instead of using the instrument constructively like the normal boy of his intelligence, he did "pseudo-typing" at full speed in childish imitation of an adult expert He covered up by calling it "typing in code" I "decoded" it for him to mean that he was still a baby. Whereon he replied he "couldn't be bothered" to type properly In later sessions he made a definite attempt to type a letter to his father but his efforts never came to much

He had the usual course of treatment. He maintained an easy optimism to the end and was always quite pleased with himself and his limited rather facile interests He told me he had come to the conclusion that his attendances at the clinic were to work off his surplus energy, and like the previous case (Peter *B*) with whom it can be seen he had many points in common, he wanted to continue indefinitely.

> The following is an extract from the conversation we had during the last session but one, when I warned him we would have to close his case.
>
> *Psychiatrist* You do well in school and I'll see you here again sometime.
>
> *Boy.* Oh no! If I do well at school I'll have to stop coming here altogether
>
> A year later his behaviour in school was reported as "more reasonable", there was less bullying and he had more friends As for school work he was doing better in all English subjects (Cf above) but "He still will not do subjects he dislikes and cannot be made to do them" All round, his performance, though the best they had yet from him, was disappointing and lacking in effort.

The last group in my classification includes the more serious psychopathic states. As already indicated I will do no more here than insert a reminder of their existence. On more than one occasion it has been my sad lot to discover that a rapid and unexpected school failure in early adolescence has been the prelude to a frank schizophrenic deterioration. Such cases are happily uncommon but they must be kept in mind when the contingency arises

D. Discussion

This paper is a clinical study only. I have given samples of the various types as I have come across them in clinic work without any attempt to estimate their distribution in the population or for that matter even their relative frequency. These cares are for the future. First one must identify the material; one must develop a clear picture of the clinical syndromes and assess the psychological states involved before one can consider any kind of measurement or any statistical evaluation.

The case material here presented underlines in no uncertain manner the far-reaching importance of non-intellectual factors in education For the most part I have illustrated the harmful effects, though it is obvious enough that there must be corresponding helpful ones Indeed there is evidence in the case of Ian that some emotional stresses can give rise to an enhanced performance at school (This is a line that might be followed up with profit by the educational psychologist.) It may be said that all the children I have quoted are extreme cases, of unusual difficulty, and requiring unusual methods of handling, which is of course the reason they were sent to the clinic But it is a truism today to point out that there is no difference, except in degree, between these so-called problem children and the bulk of the normal school population We can certainly learn from the exaggerated stresses and failures of the one, a great deal about the more or less successful adjustments of the other.

Any teacher will testify to the influence of character on school performance, which even in normal children generates pronounced differences of achievement *within the same intellectual limits.* For besides determining the child's general interests and mode of attention, emotional, or rather temperamental dispositions colour all its conative tendencies. For example there is a wide range of variation in the degree of persistence which a child brings to any interest in hand and the ease with which it is satisfied with its endeavours. The contrast between the persistent finicky perfectionism of an anxious "obsessional"[10] at one end of the scale, and the facile carelessness of a happy-go-lucky "hysteric" at the other, is sufficiently manifest to all.

There are many other contrasting qualities of this kind[11] which in the present state of our knowledge are not too clearly defined, though the modern mathematical analysis of bipolar factors in psychology is doing much to make the field clearer One quality in particular I must mention as of great diagnostic and prognostic significance in the life history of the problem child. It shows itself in the reaction to success or failure and in the response to praise or blame. All children are encouraged by praise and success, and cast down by failure or disapproval; reactions so fundamental in teaching practice as in social life generally The neurotic child is more than usually avid of praise: and more damagingly, betrays itself in a discouraging fear of failure and an oversensitiveness to criticism out of all proportion to events (cf. Case 8). Thus is set up a vicious circle that can play havoc with its work at school. Sometimes the resultant reaction is so severe as to take the form of a general retreat with corresponding poverty of performance (Case 10). At the other extreme of the range one can have too little anxiety about failure (Case 13), and the absence of adequate guilt reactions is indicative of a serious pathology, as in the emotionally infantile and with some delinquent types.

The many emotional and temperamental qualities enter into character formation in a diversity of ways almost impossible to classify with any precision or certainty. And they are inextricably interwoven with environmental factors further complicating the picture. The case material shows how in individual cases some assessment of their general strength and mode of action in the personality is necessary to arrive at the correct diagnosis and best line of treatment Unfortunately, qualities of character are not such as can satisfactorily be contained in a formal psychological test and they are not susceptible of *direct* measurement (12). Some emotional qualities reveal themselves in the ordinary intelligence test where they can and should be noted by the psychologist. Very significant are those in evidence at the stage where the child begins to find the questions difficult particularly important are the reactions to failure. Essentially, however, they show most faithfully in real life situations and their strength can best be estimated by their long range effects on achievement In other words, a carefully taken personal history, checked as in clinic practice by school records and any other impartial evidence available, is still the best guide to character and the potentialities for further achievement.

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[10] These terms do not refer to the respective neuroses but to the character types in which they are liable to develop. I have taken as a pair of opposites the deeper, steadier and more introverted obsessional and the shallow labile extravert The latter I often call the histrionic character to avoid confusion with the medical implications of the term hysteria.

[11] For a classical exposition of "opposites" in psychology see Jung (6)

Whereas intellectual limitations are now generally accepted, one no longer punishes a child for being a dunce, there is still a widespread notion that emotional factors are much easier to modify. For instance Burt writes (2, p. 45) ·

> Inheritance, or innate constitution, limits character far less rigidly than it limits intelligence. It is far more hopeful to try and improve the morally defective than the intellectually defective and it will always be unsafe to infer that some particular temperamental quality must be beyond all cure because it seems inherited or at any rate inborn

This is a view to which I cannot subscribe so wholeheartedly It assumes a plasticity of mental qualities, *in the direction of more acceptable behaviour,* which has not been my experience, though I must confess that my work brings me into contact mainly with the more severe and intractable cases The comparatively high proportion of "successes" amongst those given here would seem to contradict this at first sight, until it is remembered that they are a highly selected sample chosen primarily for ease of presentation.[12] I have taken examples of the different types of school failure without any reference to their relative frequency. Temperamental defects of character (as Case 11) must be exceedingly common, more so than neurotic failures of which I have given several instances because they are more interesting to the Child Guidance Clinic in that more can be done to help them by the special methods of modern psychotherapy. It should be noticed too in these latter that the good results obtained by the removal of neurotic anxieties leave the fundamentals of character and working habits very little changed (cf. the follow-up in Cases 5 and 6) All in all I should say that Burt's statement is too pessimistic about intellectual factors (see previously Ian, Case 12) and too optimistic about temperamental ones Results on both sides can be bettered up to a point, but up to a point only, by specially directed education

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[12] Successful cases are usually more transparent and easier to follow

Our therapeutic work at the clinic I would look upon as a special kind of emotional education[13] analogous to the specialised teaching of the defective. Just as appropriate intellectual training can improve the performance of the backward, up to their limits, so suitable emotional release can ameliorate the emotionally handicapped, also within certain limits. In both cases one uses what qualities there are to the best advantage, though it must be conceded that owing to the wider range of emotional factors there is correspondingly greater individual diversity and more scope for sublimation and canalisation of interests On the other hand there is a specific and sometimes baffling difficulty peculiar to the management of emotional problems. Most of the situations one is called upon to resolve are highly ambivalent· that is they involve a play of opposing forces which at times may be irreconcilable and a complete bar to further progress. For instance in Case 4 the father would not soften his harsh attitude till his son showed by some improvement that he was trying, to which the boy retaliated that if only father would not be so nasty he would feel more like making an effort Or take any internalised neurosis where it is an inability to reconcile conflicting emotional drives or desires that originates the breakdown Correspondingly there are alternative lines of approach to treatment, and it may need all the niceties of diagnosis to decide on which to pursue in order to get the best results.

In the treatment of educational failures of emotional origin here are the alternatives. It may be there is need for increased scholastic pressure on the usual time honoured lines (cf. Case 13), amongst which I would include appropriate disciplinary action[14] Extra work at school or at home and special coaching have their place here On the other hand it should be clear from what I have written that the method will not do for all There are the neurotic cases, with whom pressure of this kind is either useless or tends to make bad worse by setting up further and more severe conflicts and resistances The neurotic child is in need of more freedom and less pressure to obtain a very necessary emotional release. For this purpose the diametrically opposed passive and analytic approach is called for, with younger children through the free play technique, and introducing more verbal methods for the older ones

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[13] The Child Guidance Clinic has given an added impetus to the use of similar methods in education, free painting and drawing being very much encouraged nowadays See also Read (10) and Petrie (9).

[14] I am not one who would follow A. S Neill and others who favour a completely "free" school theory of education, to the extreme of leaving *all* initiative to the child Though it is obviously best to use the very minimum of compulsion, there are occasions when children must be induced to do that which *at first* they may find unpleasant.

One may also prescribe remedial teaching, a form of treatment which must be carefully distinguished from coaching Essentially it is a therapeutic procedure the object of which is to expose and rectify the child's faulty emotional attitudes to his work It is a half way house between play and teaching, more akin to play therapy than to coaching proper, though how much the accent falls on play and how much on teaching varies from case to case

Everything turns on the diagnosis of the child's personality, much depending on the potentialities for real cooperation, in the family sometimes as well as in the child. Even in satisfactory cases treatment can be protracted and results come necessarily only slowly (cf Peter *A*, Case 3). Surface willingness may be deceptive and progress may be obstructed by deeper resistances the exposure of which disclose the rigidity of the child's emotional limitations One must always be prepared to find the handicap insurmountable when there only remains to reduce one's educational demands very much as one does with the intellectually defective The following case, one of the most severe I have ever seen, is instructive on many points

Case 18

Adolescent boy with extreme scholastic failure Thomas, at the age of 16+, could not even do a child's arithmetic, some of his attempts were quite fantastic.

(1) Multiply 8 by 100 (2) Add $5\frac{3}{4} + \frac{1}{4}$

$$\begin{array}{r} 8 \\ 100 \\ \hline 8 \\ 8 \\ 8 \\ \hline 888 \\ \hline \end{array}$$

$$= \frac{19 + 17}{4} \qquad \text{i e, } 4 \times 4 = 16 \text{ plus } 3 = 19$$

$$\phantom{= \frac{19 + 17}{4} \qquad \text{i e, }} 4 \times 4 = 16 \text{ plus } 1 = 17$$

$$36$$

$$= 5 \frac{}{4}$$

$$= 59 \; ! \; !$$

His spelling was reported as utterly hopeless and the headmaster of the boarding school he had attended for the past year was of the opinion he would never get any further "for if one describes the tiniest logical process and asks for a repetition next day it has entirely disappeared"

He was by no means defective His vocabulary was that of a superior adult and his handling of words unusually good. His all round

IQ on the Terman Merrill scale worked out at 100, this in spite of his complete failure in any test involving numbers, a failure which was partly responsible for his marked scatter. The test showed him to be inordinately slow and better at practical matters than theoretical reasoning

His history went some way to explaining his defect He was educated with his sister by a governess till he was nine His sister, who was much sharper, had most of the attention: he depended a lot on her and I can well believe "He never had to think for himself." Moreover it was not found out until he was 10 that his eyesight was extremely bad When I saw him he was wearing glasses for a tremendous myopic astigmatism which made me doubt whether he could have seen well enough to do much school work prior to wearing glasses With the slowness mentioned above one could easily envisage him never having learned the fundamentals at all.

He spent four years (11-15) at the local Grammar School, though how he came to be admitted, and what he did whilst he was there, I never discovered. When at age 15 he was sent to boarding school ("To get boys' companions") his extreme educational backwardness was painfully exposed.

I had to agree with his headmaster, however, that there was more to it than just faulty educational foundations, which could not be the *sole* cause of such a severe and persistent educational failure Accordingly it was arranged for him to have remedial teaching with my educational psychologist It did help him a little, but he did not get very far and the results hardly justified the time spent on him. The educational psychologist reported severe and deep resistances calling for more general psychotherapy. Here is what I uncovered when I took him on for modified analytic treatment

He told me that he had learned that the best way of dodging was by "getting colds," for then his mother worried about his health and made a fuss of him In fact he rather accepted that as far as possible, his mother and his sister did most things for him In lessons at school his attention wandered and he was preoccupied with numerous and extravagant fantasies which he had kept very much to himself Some of them were of having a marvelous orchestra (he played the drum, self-taught): of being Tarzan: or of pseudo-erudite chemical inventions on the Heath-Robinson pattern (chemistry was the one subject he was reasonably good at) This last he had elaborated into a secret society of a very childish "blood and thunder" kind, he showed me various "papers" with "orders" for chemicals and "instructions" for his assistants The Tarzan fantasy went back many years and seemed to be a compensation for his otherwise very restricted life at home where he complained a good deal of his mother not allowing him much freedom for action

The above fantasies were to him much more important than school work about which he entertained a hopeless despondency. "I have a trick of learning things by heart and next minute your mind's blank,"

> this especially in maths On one occasion when he did half a dozen sums and they weren't wrong he thought it was a "miracle" His technique in class was just to "sit still and wait till they have finished then they give me up as a bad job" About spelling "I go blindly on, or guess, or spell phonetically." He admitted he could spell if he wanted to think, but it was too much for him Most things he disliked were too much for him, it needed very little to put him off He had been made bell-ringer at school and he found it "an awful job—too much responsibility" He blamed some of his absent mindedness on to his worrying about the bell
>
> He gradually dropped his pretentions of wanting to do better at school and revealed himself as happily self satisfied and without any very deep cares for his future [15] rather like the irresponsible infantile Cases 16 and 17

One of the great problems in educational organisation has always been the effective and accurate selection at the end of the primary stage (about age 11+) of those children likely to benefit from a higher education. Today the problem is even more acute, for to quote from a very recent report of the National Union of Teachers (8) ·

> The Education Act[16] of 1944 has given the problem of transfer from the primary to the secondary school an entirely new form . . The old problem was that of selecting from among all the children in the area the proportion who by reason of their superior ability should be given the opportunity of the higher form of education available in a secondary school Now every child is to have secondary education, and it is recognised that this demands a much greater diversity within secondary education than heretofore—a diversity which can be only partly reflected in different types of secondary school The new problem is to match the individual child to the school in which he will find the form of secondary education best suited to his needs . allocation rather than selection

The authors of the report confirm the unreliability of formal school examinations for this purpose and go on to enquire into the value of "objective intelligence tests." They conclude that "the standardised intelligence score at the age of 11 has evidential value as to the probable success of a pupil in a grammar or technical school" but "it falls far short of providing 'conclusive evidence and it could not be justified as the sole basis of selection or allocation." The rest of the report goes into the various ancillary means of making an educational diagnosis and prognosis.

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[15] His father broke off treatment in view of the very little scholastic progress made during the year he was under my care I do not know what happened to him ultimately.

[16] In this and what follows I am describing the position in Great Britain but I have no doubt that with due regard to the different social and political backgrounds the fundamentals of the problem of selection for secondary education applies equally to other countries

Burt (1) argues on very much the same lines in coming to the opinion that in any particular case one must make an assessment of *all* the relevant factors, intellectual, physical, temperamental, and sociological including domestic circumstances (the Nat. Union of Teachers report lays stress on considering the parents' wishes). Yet it is obvious as Burt says: "To demand a complete case history for every individual pupil at 11+ would be to expect the impossible The most therefore that can reasonably be proposed is that a more intensive study should be undertaken for the borderline and doubtful cases" I would only disagree with him that this could be undertaken single handed by an educational psychologist, however experienced For, as can be seen from the case material presented earlier, what he asks for is substantially identical with the practice of enquiry in Child Guidance and it needs all the resources of a fully staffed Child Guidance clinic to deal adequately with what one may meet when investigating this field

However carefully one selects (or allocates) the children there are bound to be mistakes made which have to be rectified when the child's progress, or lack of it, demands an enquiry As good a way as any is the present practice in Bradford of having an educational psychologist attached to the Child Guidance clinic and working part time in the schools Unexpected and unexplained school failures[17] go through his (or her) hands and those which seem to need it are referred to the clinic for a fuller investigation, with results as reported in this paper.

Of course it would be an advantage if as many misfits as possible could be anticipated and prevented, which would be the case if emotional factors were given due consideration and weight In this connection I would draw attention generally to the over-intelligent but emotionally immature or conflict ridden child who needs some protection against premature discouragement and failure, and is the better for not being pushed to the limits of his intellectual ability. There was a time when one hesitated to press the very bright child for fear of over-stimulation causing a breakdown When this fear was shown to be unfounded the policy became to promote as far and as rapidly as possible, even if it meant being with very much older children, leaving the young ones to make up with their superior ability for arrears of formal knowledge. Whilst it may succeed with some, the effort is too much for others, who become discouraged and suffer a progressive failure. They contrast their previous high position at the top of the class with their present low position in the form, which they feel keenly almost as a disgrace. I have been told more than once by children who have not made a satisfactory transition from elementary school to high school, how much happier they were at the elementary school where they did well and how much they would like to go back. "I was top" or "near the top" now "I'm near the bottom" is their way of putting it For them, their scholastic performance in the absolute sense is not nearly so important as their position relative to the rest of the class

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[17] And not always failures On one occasion a girl of 12+ was referred from our camp school as a school behaviour problem She was found to have an *IQ* of 167! She had been discouraged from accepting a scholarship to a high school by the doctor who thought she might not be strong enough physically. After her transfer to the Grammar school she went on to win an open scholarship to Oxford

One last point about the opposite kind of child, the overmature I have seen quite a number of preadolescents and adolescents who (like Case 15) do not take kindly to continued school attendance because of the strong urge to be doing things. For some this is their way of learning rather than the usual formal and abstract modes of education Others show a more complex determination they want to be out working and earning or at least following adult modes of behaviour, partly a result of comparison with older friends and partly an expression of increasing maturity and feelings of personal initiative and responsibility. (Their desires are often understandable when one learns about their home circumstances, economic and otherwise) They are referred to the clinic either because increasing hostility to school brings their education to a standstill, or because, more with boys, they begin truanting, when their adventurous spirits get them into mischief The problem is as yet largely for high schools only, but with the extension of secondary education under the Education Act there is likely to be a great increase in children affected

My opinion is that practical training on a wider scale could with benefit be introduced in the later stages of their school education. I would even put forward the advisability of allowing them to do part time work in appropriate cases, always of course under proper safeguards.

E. SUMMARY

A problem is presented by the discovery of children failing educationally in spite of high *IQ* The disparity between intellectual capacity on test, and educational performance is sometimes very pronounced

The hypothesis is adopted that in these children some influence of emotional nature is at work interfering with their capacity to use their intelligence consistently in life situations Individual cases show wide variations in the origin and nature of these deleterious influences. The following five categories are distinguished clinically. (*a*) Where the disturbing influence is largely of external origin: most important are psychologically unsatisfactory home conditions (*b*) Reaction character formations. (*c*) Clinically recognisable Infantile Neuroses. (*d*) Constitutional defects of character. Most of these are of temperamental origin but there is one very important group showing grave defects in emotional maturation, the emotionally infantile. (*e*) Psychopathic states and early psychosis. Examples are given of the various types.

The relative parts played by intellectual capacity and emotional factors in achievement and the possibility of their modification is briefly discussed. It is concluded that limitations of an emotional (especially temperamental) nature are more rigid than is usually accepted.

The ambivalence of difficulties of emotional origin presents alternative lines of treatment with educational failures of the above kind, viz.: increased educational pressure for some, as contrasted with psychiatric treatment for others: remedial teaching is half way between the two The importance of diagnosis in any particular case is stressed.

A note is added on the practical bearings for secondary education of some of the findings.

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THE EFFECT OF CONTINUED FOOD DEPRIVATION ON HOARDING IN THE ALBINO RAT*

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A. INTRODUCTION

The purpose of the present paper is to present the results of an experiment carried out to determine the effects of 35 days of continuous food deprivation on the level of hoarding in the albino rat. Stellar and Morgan (3, p. 53), using a group of rats which experienced 26 days of food deprivation, report in support of a previous study (1), "that effects of a deprivation cycle accumulate over a period of days until they reach some critical level of deficit which instigates hoarding . . . the amount of hoarding does not vary quantitatively with the amount of deprivation but rather appears at its maximal amount when deficits in the body accumulated through deprivation reach a 'threshold' level." These investigators found that there is a tendency for hoarding scores to level off and remain relatively constant However, continued deprivation has not been carried on long enough to determine for what period this level will remain constant, i e, is there an *upper* threshold of hoarding, at which point, due to accumulated deficits, level of hoarding will take a downward trend? If deprivation is *severe*, the degree of competition between eating and hoarding should gradually decrease and hoarding scores should tend to decrease and eventually approach zero since more time would be devoted to eating than to hoarding The present experiment was done in an attempt to explore this area.

B METHOD AND PROCEDURE

The apparatus and cages used in the experiment were the same as those employed in a previous study by Ross, Smith, and Nienstedt (2)

Eight animals, litter-mates, four males and four females, were used. The subjects two months old at the start of the experiment and had been living in individual cages for the previous 25 days with an excess of food and water They were of the *CF*-Wistar strain, bred in the laboratory at Bucknell

At 60 days of age, the animals were placed upon a feeding schedule as

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follows: *Each morning at 0830, each rat was given a ration of food pellets* equal to 1/18th of its initial body weight as measured when the rat was 59 days old. The sex, weights, and amount of food pellets are shown for each subject in Table 1. The rats were permitted to eat freely for 30 minutes, then the remainder of the food was removed for the 30-minute hoarding trial. When the hoarding was completed, what was left of the ration was returned to the animal. Water was present in the cages at all times.

TABLE 1
SHOWING SEX, WEIGHT OF EACH SUBJECT AT 59 DAYS, AND DAILY RATION

Subject	Sex	Weight	Ration
1	F	114.4 grams	6.4 grams
2	M	212.6	11.8
3	M	226.8	12.6
4	F	163.0	9.1
5	M	269.3	15.0
6.	M	233.9	12.9
7	F	148.8	8.3
8.	F	177.2	9.3

This method of feeding was adopted in an attempt to equalize somewhat the deprivation experienced by each subject, on the assumption that there is some relationship between food consumption and body weight. Previous experience with the 30-minute feeding period led the writers to adopt another technique as it was felt that time is not a wholly adequate criterion. As will be shown later, the body-weight ratio method of feeding is also inadequate.

Hoarding trials were conducted six days per week for a period of five weeks. The ration was fed in the same manner at 0830 each Sunday morning, but no hoarding trials were made.

C. RESULTS AND DISCUSSION

The data for the five-week hoarding period are graphically presented in Figure 1 which shows the mean daily hoarding scores for the group of subjects. Once again, the "all or none" characteristic of hoarding is evident as has been reported by Stellar and Morgan (3). Total hoarding for Week 2 represents an increase of 875 per cent over Week 1, indicating the probability that accumulated deficits in the body through deprivation reached a "threshold" as predicted. This explanation is preferred to one wholly in terms of learning during the first several days of the hoarding period.

Figure 1 shows an unexpected 62 per cent decrease in hoarding for Week 3 as compared with Week 2. The laboratory room used was laid out in a

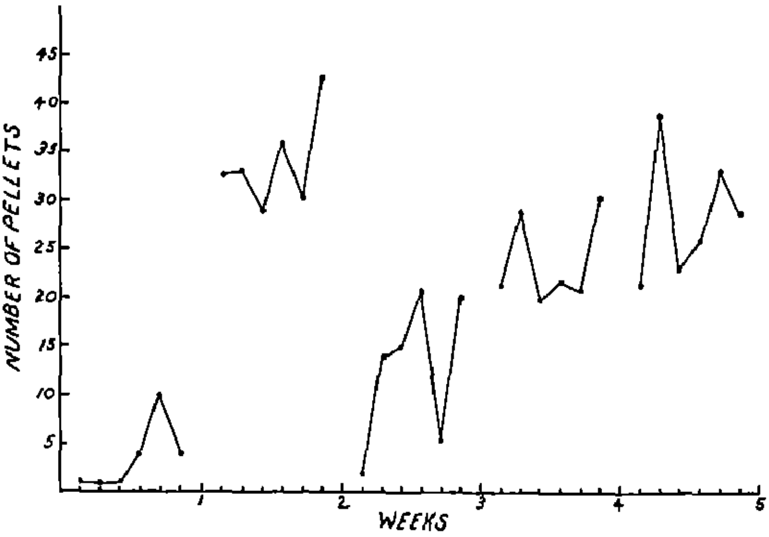

FIGURE 1
Mean Number of Pellets Hoarded Daily by the Eight Subjects

manner which permitted the use of four cages and hoarding alleys on each side Following the hoarding trials on the 13th day, the cages and alleys were moved from one side of the room to the other In so doing each cage was rotated 180 degrees as well As a consequence, practically no hoarding took place on the 15th day and hoarding during Week 3 never at any time returned to the level of Week 2. It is unfortunate that the cages were moved, but the consequent results certainly indicate how easily hoarding behavior can be modified by environmental factors. The lighting was well distributed throughout the room and noise cues, if detectable, would seem to have been equally effective for both sides of the room. One is left with the alternative of geographic re-orientation as the major operating factor Apparently 48 hours was not a sufficient period for readaptation to the changed appearance of the room As a matter of fact, hoarding never returned to the level of Week 2 Week 4 total hoarding increased 87 per cent over Week 3 and Week 5 total hoarding increased 20 per cent over Week 4 These increases, as can be seen from Figure 1, bring the hoarding level significantly above Week 3, but less than the level for Week 2

It is problematical whether or not this failure to return to the original level of hoarding is entirely the result of failure to achieve geographic reorientation The original purpose of this study was to determine whether or not hoarding would remain at a relatively constant level throughout the five weeks of food deprivation. The writers believed on the basis of previous results (3) that over a period of several weeks hoarding reaches a peak and then drops to a relatively constant level. Theoretically, if the deprivation is severe enough, competition between hoarding and eating would eventually weaken and more time would be devoted to eating Consequently the hoarding level would tend to drop and might conceivably reach zero after several weeks of deprivation Our results, based on only five weeks of food deprivation, do not indicate that this falling off is definitely the case It was observed, however, in the case of the subjects receiving relatively small rations, that there was a tendency for them to spend more time in eating than in hoarding during the 4th and 5th weeks. The method used in providing the daily ration, i e, of giving 1/18th of the body weight at the start of the experiment, did not provide *severe* deprivation for all subjects The larger animals tended to gain weight slowly while the weights for the remainder of the group remained fairly constant Perhaps a ratio of one gram of food to every 36 grams of body weight would give clear cut individual results of the eventual effect of deprivation on hoarding level.

A rank-difference coefficient of correlation of —79 (*PE* 0.1) was found between size of the ration and total number of pellets hoarded for the entire period. This correlation is significant at the .05 level, and almost significant at the 01 level for the group involved. Since this was a group containing an equal number of males and females, and since there was no overlap in weight between the sexes, it would follow that the females, which weighed less and consequently received smaller rations than the males, hoarded more as a group than did the males as a group The only "non-hoarder" of the group was a female, No 7. During the 4th and 5th weeks the females tended to eat more frequently during the hoarding trials. The amount of time spent in eating remained approximately the same for the males.

D. SUMMARY

The purpose of the experiment was to investigate the effect of a continuous 35-day period of food deprivation on hoarding in the albino rat.

Eight litter-mates, four males and four females of *CF*-Wistar stock, were used when they were 60 days old. The rats were placed on short daily rations of 1/18th of their body weight on the 59th day.

It was found that hoarding reached a peak during the second week, which was not equalled by any later performance Hoarding decreased markedly during the third week when the cages had to be shifted The mean hoarding level does not indicate a marked falling off of hoarding for the 35-day period

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A PRELIMINARY STUDY OF INDIVIDUAL AND GROUP HOARDING IN THE WHITE RAT*

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A. THE PROBLEM

In 1946, Miller and Postman (2) reported the results of a study of individual and group hoarding in rats. These workers used rats which were five to six months of age and had been reared in a group until the start of the experiment. The rats had been amply supplied with food and water and were selected at random The methodology of the experiment was to allow the rats, who lived in *individual* cages, to hoard simultaneously from a central bin. It was found that some of the rats had a preference to hoard from the central bin, while others hoarded predominantly from the cages of the other rats. The rats showed no particular interest when their hoards were stolen by an intercage hoarder, except when the intruder attempted to take the pellet out of the victim's mouth "This ultimate in acquisitiveness would lead to a fight in which the intruder was usually defeated" (2, p 658). The writers stated that there was very little indication that placing the rats together in a group had any profound effect upon their behavior. They did not find very much evidence that dominance or competition was at work. There was some evidence, however, that the introduction of other rats decreased the amount of hoarding.

The purpose of the present investigation was to study the hoarding behavior of rats reared in isolation when they were allowed to hoard in isolation and when they were introduced into a group hoarding situation. It was felt that the group situation might have a differential effect upon hoarding with the possibility of the establishment of a dominance relationship. Special emphasis was placed upon observing whether a rat would fight when his mate tried to take a pellet out of his mouth, as Miller and Postman found, since the ability to take pellets away seemed to be a good indicator of dominance-submission status

B METHOD AND PROCEDURE

It will be convenient to describe the method and procedure under the following conditions. subjects, living conditions, and experimental procedure.

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1. *Subjects*

Three males, taken from the same litter, were used as subjects. The rats had lived together for the first 34 days of life and then were housed in individual cages They were 112 days old at the start of the experiment These rats were selected becouse they were known to be open alley hoarders The complete litter was allowed to hoard individually on the open alleys prior to the start of the experiment Each of the three rats hoarded five or more pellets (Purina Chow) on at least two separate trials. The original stock for this colony was obtained from Carworth Farms, Inc , New City, New York.

2. *Living Conditions*

The experimental set-up has been fully described elsewhere, together with the details of the diet (4) The alleys were 39 inches long, 4 and 9/16 inches wide, and were approximately three feet from the floor. In the group situation, two alleys were placed side by side

3. *Experimental Procedure*

The study began on February 28, 1949, when the rats were 112 days old and continued for eight weeks. A five-day period of testing was maintained, Monday through Friday. The experimental hoarding period took place at approximately 11 A.M for 30 minutes

During Week 1 all rats hoarded in isolation During Week 2, Rats 1 and 2 hoarded together, and Rat 3 continued to hoard in isolation. During Week 3, Rat 2 hoarded alone and Rats 1 and 3 in a group. During Week 4, Rat 1 hoarded alone and Rats 2 and 3 were together Week 5 was the same as Week 2, Week 6 as Week 3, and Week 7 as Week 4. During the last week of the experiment, all subjects again hoarded in the solitary condition. The rats hoarding under group conditions were marked with stain so that they were easily distinguishable for observational purposes

Whenever group hoarding was to be done, the rats composing the group were placed in a *neutral cage,* immediately after the hoarding trials on Friday. It must be noted that this neutral cage was not considered to be a *strange cage* as described by Vick and Miller (5) These workers used as their strange cage one that differed greatly from the home cage Their strange cage was made of wood (while the home cage was of metal), and was darker and larger than the home cage.

In their experiment (3) to determine what constituted a strange cage, these workers found that olfactory cues were of greatest importance and that visual cues ranked second. In the present instance the visual cues were eliminated by using a neutral cage of the same appearance and dimensions as the home cages of the rats. The olfactory cues could not be eliminated by the method employed by Miller and Viek since they introduced the rat's shavings underneath the strange cage to give it a "home" smell. This difficulty was taken care of by placing the group in the neutral cage immediately after the hoarding trials on Friday and allowing them 72 hours in the new situation before the start of the hoarding trials It was assumed that by the end of this period the rats would have established some social relationship with each other, and would have become accustomed to the new environment. Thus, the neutral cage might be termed a "secondary home cage." Three neutral cages were used so that each different group was placed in a different neutral cage

All the rats were put on a deprivation diet, which consisted of two pellets of Purina Chow per rat, on Sunday, 24 hours before the start of the first hoarding trial. They then hoarded individually for 30 minutes each day (Monday through Friday) during which time they were kept on the deprivation diet. When the rats hoarded more than two pellets, the excess was taken from them immediately after the hoarding trial The experimenter also noted how many pellets were eaten during the trials to be certain that none of the rats received more than two per 24-hour period.

At the end of the hoarding trials on Friday of the first week the two rats that were to be placed into the group situation were immediately placed in their neutral cage All the rats were then given a satiation diet for 48 hours (from Friday until Sunday), and were placed on the deprivation diet again on Sunday The hoarding trials for the second week began on Monday and the same procedure was followed throughout the experiment

C. Results and Discussion

The basic results for each rat under the various conditions of the experiment are shown in Table 1. The table shows the mean number of food pellets hoarded (for a five-day week) by each subject under the solitary and group conditions

TABLE 1
Showing the Mean Number of Food Pellets Hoarded by Each Subject Under Solitary and Group Conditions*

	Week							
Subject	1	2	3	4	5	6	7	8
1.	15.8	*11.8*	*14.4*	18.0	*5.0*	*4.5*	7.5	7.8
2	5.0	*1.2*	5.8	*2.2*	*1.4*	2.0	*1.4*	1.6
3	10.8	6.8	*13.4*	*4.0*	4.2	*9.2*	*5.2*	10.4

*Group hoarding mean scores are shown in italics

The hypothesis to be tested was that rats reared in isolation would hoard less when placed in a group hoarding situation than when permitted to hoard in isolation For each rat the number of pellets hoarded under solitary and group conditions was compared by means of the *t*-test

Rat 1 hoarded less under solitary conditions, averaging 3.35 pellets less per day under group conditions ($t = 1.81$). The difference is not statistically significant For Rat 2, the t value is 3 31, which indicates a statistically significant depression of hoarding under group conditions Rat 3 hoarded approximately the same amount under solitary and group conditions These findings suggest interesting and important effects which might be different for each individual subject. The notes recorded during the experiment might be of interest in this connection

Throughout the trials it was noticed that, when placed into group situations, the behavior of the rats differed in one major respect from those reported by Miller and Postman (2). This difference was the fact that several times one of the rats would take a pellet out of the the mouth of its mate with little or no resistance on the part of the "attacked" rat. It appeared as though a dominance-submission relationship had been established within the group with the rat which was able to take the pellets away from the other rat being the dominant one An analysis of these notes was made.

Rat 2, which hoarded significantly less under group conditions, was always the more submissive in all groups. Rat 1 and Rat 3 were able to "push" Rat 2 around the cage with ease, and were successful in removing the pellet from the mouth of Rat 2 Rat 3, which hoarded almost as much in the groups as he did in isolation, was always equal to or dominant over the other member of the group Rat 1, which hoarded less (though not significantly so) in the group was dominant over Rat 2, but submissive or equal to Rat 3

Another indication of Rat 2's submissive behavior under group conditions was found when an analysis of variance (1) was employed to compare hoarding in isolation with hoarding in Group 1 (Rats 1 and 2) and Group 2 (Rats 3 and 2). It was found that hoarding was significantly depressed when Rat 2 was placed into a group situation, and that both groups had about equal effects in causing this depression

From the data it appears that there was definite social interaction among the rats with the submissive rats being inhibited in the group hoarding situations. This is in agreement with the tendency of hoarding scores to decrease upon the introduction of other rats, noted by Miller and Postman (2) It would be of some interest to determine the results with rats raised as groups and hoarded in isolation as compared with the present subjects, who were raised in isolation and hoarded both in isolation and in groups.

D. Summary

Three male *CF*-Wistar strain litter-mates, who were reared in isolation from weaning until 112 days old, hoarded under solitary and group conditions over a period of eight weeks.

It was found that a dominance-submission relationship was established when Rat 2 was placed into a group situation. This subject was always the submissive rat. Rat 3 was found to be the most dominant of the three subjects, with Rat 1 occupying an intermediate position.

It was concluded that when rats are allowed to hoard under isolation and group conditions over a period of eight weeks, the rat or rats who are the more submissive members of the group will hoard less under group conditions than under isolation conditions. The more dominant member or members will hoard about the same amount under both conditions.

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SHORT ARTICLES AND NOTES

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HYPNOTIC AGE REGRESSION AND INTELLIGENCE*[1]

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A. PROBLEM

The use of regression techniques with hypnosis has revealed evidence that it is possible to elicit behavior characteristic of an earlier stage in an individual's chronological development This has been demonstrated with regard to both physiological and psychological functions (1, 2,) One important question raised in connection with the significance of hypnotic regression is the extent to which the individual's organ systems are involved. That is, is the material brought forth by hypnotic age regression the result of increased recall aided by suggested simulation or is it the direct representation of a totally involved organ system operating exactly as it did at that stage in the individual's maturation If the latter hypothesis were to be confirmed, the technique of hypnotic age regression would hold wide implications for systematic study of the developmental aspects of behavior.

This investigation was designed to study the relationship of intelligence to hypnotic age regression. Mental ability as a global function involves a distinct organ system of the body The purpose of this study was to determine whether or not intelligence test scores would reflect age regressions under hypnosis consistently.

B. PROCEDURE

Ten undergraduate male students attending a course in general psychology were selected for this study The criteria for selection were rapid hypnotic induction and the ability to maintain eye opening under hypnosis without disrupting the trance state The subjects' age range was from 20 to 24 with a mean of 21.5.

All subjects were given equivalent forms of the Otis Tests of Mental Ability (3), first in the waking state and then in three hypnotically regressed

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states. Higher Form *A* was used in the waking state Higher Form *B* was then administered at a regressed age level of 15 followed by Intermediate Form *A* at a regressed age of 10. The final test was Intermediate Form *B* at a regressed age of 8. All tests were administered in the same order and with identical directions to all subjects.

Hypnosis was induced by a visual fixation technique and suggestions of eye closure. A satisfactory hypnotic state was said to be achieved when voluntary eye opening could not be accomplished. The hypnotic state was then deepened by suggestions of sleep and all subjects responded to sensorimotor suggestions before testing was started. All of the subjects were able to take the tests under hypnosis without any disruption of the trance state. Age regression was obtained by telling the subject that after a brief count he would be able to open his eyes but that he would be first 15 years old, then 10 years old, and finally 8 years old. Separate counts were used for each regression In addition to the prescribed directions for administering the Otis tests, each subject was told prior to his taking the test that he would want to cooperate in taking a test of "general information." The tests were run in two sessions one week apart. Two tests were given in each session.

C. Results and Discussion

Table 1 contains the Otis raw scores and the *IQ*'s for each subject in the waking state and the three hypnotically regressed states In the waking state the mean raw score for the entire study population was 59.2 which yields an *IQ* of 117. When regressed to the 15-year age level the raw score drops to 54.2 and the *IQ* obtained was 118 This small though significant drop in raw score is not inconsistent with mental maturation as measured by this

TABLE 1
Otis Raw Scores and *IQ*'s

	Waking state		Hypnosis-15 years		Hypnosis-10 years		Hypnosis-8 years	
Subject	*RS*	*IQ*	*RS*	*IQ*	*RS*	*IQ*	*RS*	*IQ*
A	55	113	48	112	33	110	19	112
B	60	118	55	119	45	122	27	120
C	61	119	57	121	46	123	26	119
D	52	110	45	109	30	107	14	107
E	65	123	62	126	50	127	32	125
F	53	111	49	113	35	112	18	111
G	52	110	50	114	35	112	19	112
H	60	118	54	118	41	118	26	119
I	68	126	63	127	50	127	32	125
J	66	124	59	123	49	126	32	125
Mean	59.2	117	54.2	118	41.4	118	24.5	118

test since the statistical data from the manual indicates a maturational peak at the age of 18 (3) which is somewhat above the level of other tests, particularly the Wechsler-Bellevue and the Stanford-Binet. At the 10-year age regression the mean score was 41.4 and the *IQ* 118. The 8-year-old age regression indicated a raw score mean of 24.5 and an *IQ* of 118. The results appear quite positive. As the subject's age becomes younger under hypnotic regression the raw scores which on this test represent the total number of questions answered correctly drops significantly from a high of 59.2 at the age of 21.5 to a low of 24.5 at the age of 8. This drop in raw score appears to be consistent with what one should expect at each of the younger age levels since the *IQ* remains constant. All subjects in the study showed consistent changes in raw scores with no *IQ* variation exceeding four points. If an average variation in *IQ* were to be computed it would not exceed three points, which would not be a significant change on the basis of retesting alone. In fact, the changes in *IQ* here show less variation than one would normally expect to encounter on retesting in an orthodox examining procedure.

Table 2 indicates the grade status obtained from the means of the Otis scores for each age level. At the waking (control) level the Otis score yields a grade equivalent of more than 12, which is as high as the normative data provides. Based upon college student norms, this score would be at the 71st percentile. When regressed to the 15-year level the grade status is still above 12 though on college norms the mean score is at the 51st percentile. At the 10-year regression level the grade equivalent is 6.9 and at the 8-year level 4.6. The loss in grade status is consistent with the loss in chronological age and the loss in Otis raw score. The constancy of the *IQ* indicates that there is no evident loss in brightness but rather a loss in achievement power.

TABLE 2

GRADE STATUS CORRESPONDING TO OTIS RAW SCORES

Group	Mean score	Grade status
Waking State—21.5 years	59.2	71st Percentile college norms
Hypnosis—15 years	54.2	52nd Percentile college norms
Hypnosis—10 years	41.4	6.9
Hypnosis—8 years	24.5	4.6

The data from this study would seem to indicate that when an individual is regressed in age through hypnosis his mental ability assumes a functioning level consistent with that age Changes in intellectual functioning reflect losses in maturational power and not in capacity or brightness.

D CONCLUSIONS

The results from the administration of a series of equivalent intelligence tests at hypnotically regressed age levels showed consistent changes for an experimental population of 10 male college students. For all subjects there was a significant loss in raw score which coincided with the age to which they had been regressed. *IQ*'s remained constant From the regressed age of 8 to the waking age of 22, the test scores reflected a picture of mental maturation characterized by an increasing achievement power with a constant measure of brightness. From this study it appeared indicated that hypnotic age regression involves much more than recall and simulation acuity With specific reference to intelligence, hypnotic regression seems to involve the entire organ system and permits measurements of mental ability which reflect maturational changes Further work with other mental functions is still needed to clarify the nature of regression phenomena, but it would appear that this method of investigating developmental factors involved in behavior is a valid one from a maturational point of view.

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RELATION OF CRANIAL ELECTROSHOCK TO CONVULSIVE AND MAZE BEHAVIOR IN THE WHITE RAT*

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A. PROBLEM

This study attempted to clarify relationship of current to the decrement in post-shock maze learning of the white rat. A double shock convulsive stimulus, i.e., two shocks spaced four seconds apart, was introduced as a novel approach in animal cranial electroshock. The following two hypotheses were investigated:

1. White rats, administered a high current, convulsion producing electroshock at 1,580 volts for 0.2 second, once daily for 10 consecutive days, give a maze performance statistically significantly different from the maze performance given by similar animals administered a low current, convulsion producing electroshock under the same experimental conditions.
2. White rats, administered two electroshocks of the same dosage, spaced four seconds apart once daily for 10 consecutive days, give a maze performance statistically significantly different from the maze performance given by similar animals administered one electroshock of the same dosage under the same experimental conditions.

B. METHOD AND PROCEDURE

1. *Subjects*

Fourteen male and 14 female white rats, ranging in age from 16-18 months, were used in the preliminary experiment. For the experiment proper, 32 male white rats approximately 10 months old were used.

2. *Apparatus*

An electroshock machine, a modification of Hayes' (1) inductorium, capable of delivering 1,580 volts, at 0.2 sec., at varying milliamperages, was constructed. (3) A 19-unit elevated skeleton maze, arranged in a pattern described by Miles (2), a 21-unit elevated skeleton maze, and an orientation runway were also constructed.

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3. Procedure

a. Preliminary experiment. Using 13 groups of two or three rats per group, electroshock dosages were administered consisting of two shocks spaced four secs. apart, at 1,580 volts, at each of the following calculated milliamperages 18, 21, 23, 24, 26, 29, 35, 45, 53, 63, 79, 105, 158. A convulsive reaction appeared when the animals were subjected to shock magnitudes ranging from 24 to 158 milliamperes. Sub-convulsive behavior resulted from shock magnitudes of 18 to 24 milliamperes (3).

b. Experiment proper After allowing the rats to adjust on an orientation runway, they were required to master the 19-unit maze to a criterion of three out of four perfect runs (4). Five statistically similar groups were then established A "control" group of eight rats and four "shock" groups of six rats each. Daily shock dosages at 1,580 volts for 0 2 sec. were administered to each of the shock groups for 10 consecutive days. One "shock" group received a double shock (two shocks spaced 4 secs. apart) at 62 ma., another a single shock at 62 ma., the third a double shock at 35 ma., and the fourth a single shock at 35 ma. All dosages produced convulsions.

The control group was handled similarly to the shock groups with the sole exception that no electroshock was administered. Relearning trials were run two days post-shock on the 19-unit maze. Only 24 rats were physically able to re-run the maze Relearning trials were also held 25 days post-shock on the 21-unit maze, in which 5 "control" rats and 10 "shock" rats participated

C. Results and Discussion

The statistical results of the maze relearning trials two days post-shock are given in Table 1 (*a*) A significant (utilizing the 1 per cent level as a criterion) difference between the control and each of the shocked groups. (*b*) No significant difference in decrement of maze relearning trials between high and low current single shock groups (*c*) No significant difference be- or between double shock low current and single shock low current groups. (*e*) No consistent relationships existed among the various shock groups

Thus, the hypotheses postulated at the beginning of the experiment were not substantiated. The results of the maze relearning trials (25 days post-shock) revealed no statistically significant difference between the control group and each of the shock groups. Apparently, some form of spontaneous recovery had occurred during the 23-day interim period, allowing the shocked rats to regain their maze learning ability. The possibility exists that the decrement in learning, as manifested by the trials two days after shock, was due to temporary physiological alterations exhibited as a loss in goal

TABLE 1

STANDARD ERRORS OF THE DIFFERENCE BETWEEN MEANS, *T*'S, AND *P*'S FOR THE POST-SHOCK MAZE TRIALS RUN TWO DAYS AFTER SHOCK

Groups compared	Standard error of the difference between means	*t*	*P*
Control vs. DSHC	3.7	4.8	less than .001
Control vs. DSLC	.7	10.0	less than .001
Control vs. SSHC	1.7	5.5	less than .001
Control vs. SSLC	3.2	4.4	.001 to .01
DSHC vs. DSLC	3.9	3.0	.02 to .05
DSHC vs. SSHC	4.1	2.1	.05 to .1
DSHC vs. SSLC	4.9	.8	.1 to .5
DSLC vs. SSHC	1.7	1.3	.1 to .5
DSLC vs. SSLC	3.2	2.2	.05 to .1
SSHC vs. SSLC	3.6	1.4	.1 to .5

Key: DSHC—Double Shock High Current Group.
DSLC—Double Shock Low Current Group.
SSHC—Single Shock High Current Group.
SSLC—Single Shock Low Current Group.

directed activity on the behavior level. This would explain the reappearance of learning ability on the maze trials 25 days after shock.

D. SUMMARY AND CONCLUSIONS

This study attempted to determine the relationship of cranial electroshock to convulsions and the animal's maze performance.

A shock apparatus, delivering 1,580 volts at 0.2 sec. at varying amperages, a 19-unit, and a 21-unit maze were used.

Fourteen male and 14 female rats, all about 17 months old, were used to determine the behavior correlated of double shocks with varying milliamperages. On the basis of these results, a high and low milliamperage shock dosage was established.

Thirty-two 10-months-old male rats were run to a criterion on the 19-unit maze, and then, on the basis of these results, divided into four similar groups of six animals each, plus a control group of eight animals. Of the four groups, one received a high current double shock (two single shocks spaced four seconds apart), another a low current double shock, the third a high current single shock, and the fourth a low current single shock. All groups were shocked daily for a period of 10 days. Two days after the last shock day, the 24 rats physically able were re-run on the 19-unit maze to the criterion, or until a significant degree of maze inadequacy was demonstrated. Three similar control and shock groups, consisting of 15 rats, were re-run on the 21-unit maze 25 days after shock.

The observational results, and those in the form of intergroup T's indicated that: (*a*) the shock groups differed significantly from the control on the maze trials two days after shock, but not 25 days after shock, (*b*) double shock yields no significantly different maze relearning than single shock; high current yields no significantly different maze relearning than low current.

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BOOKS

The *Journal of Genetic Psychology*, the *Journal of General Psychology*, and the *Journal of Social Psychology*, will buy competent reviews at not less than $2 per printed page and not more than $3 per printed page, but not more than $15.00 for a single review.

Conditions. Only those books that are listed below in this section are eligible for such reviews. In general, any book so listed contains one or more of the following traits: (*a*) Makes an important theoretical contribution; (*b*) consists largely of original experimental research; (*c*) has a creative or revolutionary influence in some special field or the entire field of psychology; (*d*) presents important techniques.

The books are listed approximately in order of receipt, and cover a period of not more than three years. A reviewer must possess the Ph.D. degree or its equal in training and experience.

Procedure. If among the books listed below there is one that seems important to you, you are invited to write a review of that book. It is not necessary to make arrangements with the Editor. Just send in your review. It does not matter if the book in question has been reviewed before.

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(Sheldon, W. H., et al. Varieties of Delinquent Youth: An Introduction to Constitutional Psychiatry. New York: Harper, 1949. Pp. 899.)

Reviewed by Louise Bates Ames

Varieties of Delinquent Youth is a worthy successor to the brilliant series of earlier publications by William Sheldon. Of these books, *The Varieties of Human Physique* and *The Varieties of Temperament* constitute what many scientists consider the most objective and useful basis that we have for the study of individuality. The first volume in the series, *Psychology and the Promethean Will* presented the thesis that we have need of a biologically oriented psychology—and psychiatry—in place of the essentially theological orientation underlying all current social institutions. Such a psychology would take as its operational frame of reference a scientifically defensible description of the structure, together with the behavior, of the human organism. This psychology is termed a constitutional psychology because the procedures take their departure from analysis of the physical constitution.

Assuming that behavior is a function of structure, and that we cannot adequately explain until we have at first described, the present volume proceeds to describe the behavior and the structure of 200 delinquent male subjects. These subjects are boys who had been referred to the Hayden Goodwill Inn, a Boston South End social agency devoted principally to an effort to salvage more or less advanced cases of youthful delinquency and of "precocious down-and-outism." They were followed through approximately eight years each. By means of these case histories the author aims to scale and to quantify delinquency, and to establish a correlative integration between description of living organic structures and the life histories of those structures. Interpretation or explanation of personality is throughout undertaken against the frame of reference of a taxanomic description of the physical constitution.

Methodologically the present investigation proceeds along lines laid down in the earlier volumes. The somatotype of each subject is first determined, i.e., his relative endowments in endomorphy, mesomorphy, and ectomorphy. (These technical terms will not be explained here since it is assumed that the average reader of this journal is at least familiar with the terminology of constitutional psychology, whether or not he is in accord with the theory.) The temperament (or pattern of behavior quantitatively expressed in terms of some schema of components which offers a frame of reference for an operational psychology) is then described in terms of the relative weightings of viscerotonia, somatotonia, and cerebrotonia

There has been, in relation to the earlier publications, some controversy as to the consistency of the somatotype In the current volume, Sheldon states clearly that he considers a somatotype to be "a best effort to gauge or quantify the morphogenotype." The morphogenotype is defined as "the three-dimensional trajectory through time along which an organism will travel under basal conditions By basal conditions are meant environmental circumstances in which nutrition and exercise remain optimal for health and in which no detectable gross pathology is encountered " Since the somatotype is an attempt to gauge the morphogenotype (which remains consistent), if the attempt is skillful, if there are no disturbances of nutrition or exercise, and if no gross pathology is involved, there should be little variation in the somatotype. Temperament has been found to correlate with primary morphological components about + 80. This correlation is taken for granted in the present volume and it is assumed that structure and function are best viewed as a continuum.

Before presenting the case histories, which make up the bulk of the book, Sheldon suggests an "outline for an operational psychiatry" in the hope that a description of temperamental pathology will reflect "a little light on the vast turmoil of verbality that psychiatric thinking and writing have created " He suggests further that what we need is an operational psychiatry This would require us to acquire the habit of systematically describing psychiatric behavior Neither the currently popular "psychoanalytic slang" nor the Kraepelinian typology is considered capable of doing this effectively. In studying the present cases it was frequently observed that some subject had received, from the social agencies which had worked with his case, as many as a dozen different diagnoses and interpretations, sometimes embracing the entire repertory of the Kraepelinian typology.

It was found necessary to formulate a new approach to psychiatric classification before it was possible to integrate constitutional morphology and temperament with the vast wealth of specific information that can be accumulated through psychiatric study and referral. After considerable preliminary theorizing, the question was suggested: *Are there perhaps three first-order psychiatric components, each with its polar point of reference falling opposite one of the established poles of the somatotype distribution?*

A simplified version of such a correlation between psychiatric classification and somatotype would be as follows

> The "perfect" or complete manic-depressive, the Ψ 7-1-1, falls as near as he can get to the point where the somatotype 7-7-1 would fall if there were such a somatotype Moreover, the individual who would be described as Ψ 7-1-1 seems in many respects to be striving to behave as an individual of the impossible somatotype and temperament 7-7-1 might be imagined to behave. The psychotics of the manic and manic-depressive stamp behave for all the world as if they had somehow strayed into a stretch of cerebropenic territory which lies *out beyond the confines of integrative possibility* Such a person would be so fearfully over-endowed with both viscerotonia and somatotonia that any kind of effective or adaptive integration of his tumultuous impulses would be presumably impossible
>
> The Ψ 1-7-1, perfectly and completely paranoid, falls as near as the human organism can get to the somatotype 1-7-7, or to the point where that somatotype would be if there were such a somatotype This is out in pathologically visceropenic territory. A creature of 1-7-7 temperament would reach the highest extreme in both aggressive energy and hyper-awareness but would be without affect
>
> The 7-1-7 position is of a different nature This is the ultimate antithesis to positive affirmation and to projection This is renunciation in the conceptual absolute sense . This is what Dr Jung might call an Archetype for the jettisoning phenomenon observed in hebephrenic schizophrenia . The 7-1-7 promontory is on the darkened side of the mountain where the energizing sun never shines To seek this shrine is to wander deep into the shadow of abnegation of biological self, and this becomes disengagement from competitive life

Such a correlation of primary morphological components and the primary psychiatric components, undertaken by Dr Phyllis Wittman and the writer, yielded the figures given in Table 1. This table appears "to answer affirmatively the question as to whether the physical constitution is in fact related to what psychiatrists try to gauge when they make diagnoses in mental hospitals"

TABLE 1

	Psychiatric Component I Manic-depressive	Psychiatric Component II Paranoid	Psychiatric Component III (Heboid)
Endomorphy	+ 54	— 04	— 25
Mesomorphy	+ 41	+ 57	— 68
Ectomorphy	— 59	— 34	+.64

Three types of delinquency, based on morphology, are also suggested. the

Dionysian, which stems from pathological lack of the cerebrotonic component, paranoid, which stems from pathological lack of the viscerotonic component, and hebephrenic, which stems from pathological lack of the somatotonic component.

As a result of the correlations presented above between the primary morphological and primary psychiatric components, the thesis is suggested.

> "The reaction patterns on which the psychiatric index is based are part of a continuous multi-dimensional distribution of human behavior which embraces not only the whole range of maladaptive behavior but likewise the range of adaptive and superior behavior; that therefore the problem of psychiatric classification is part and parcel—one and the same—with the problem of general psychological classification" A corollary of this thesis is that "while the temperamental predispositions reflected by the primary components may when out of hand interfere fatally with social adaptation, it is possible that these same predispositions, adequately blended with or balanced by their counterdependencies, may often be of evolutionary value"

The main body of the book is made up of detailed biographies of the 200 delinquent subjects of this study. These are grouped under the following headings: Mental Insufficiency, Medical Insufficiency, First-Order Psychopathy, Second-Order Psychopathy, Alcoholics, Gynandrophenes, and "Criminals" Each record includes photographs of the subject and data on his temperament, nature of his delinquency, origins and family, mental and medical history, as well as a running record of his activities while connected with the Hayden Goodwill Inn, and summary and comment which includes prognosis.

These data are presented very compactly with a minimum of words conveying a maximum of information in a remarkably lively but often extremely biting manner. In toto they comprise a somewhat unanswerable criticism of the social agencies which have dealt with these boys and of the society which permits such situations as here described to flourish

As one critic has commented after reading them· "It would be impossible to read these cases without seeing the nature of the problem The boys tell their own story with such eloquence that (any) elaboration of the theme could only be an anticlimax."

The somatotype photographs which accompany each biography are of inestimable value to the lay reader not only in helping him to visualize the various somatotypes, but in making convincing the theory, advanced later in the book, that many of the subjects present primary insufficiency and not primary criminality

It is unusual to read so long a series of case histories without feeling that not only the reader but often even the writer himself has lost interest long before he finishes. Not so in the present series Nearly every case presents its own interesting deviations, its own surprises.

In reviewing the data presented in the 200 case histories, Sheldon points out that the majority of the subjects were decidedly mesomorphic and decidedly ectopenic There appeared to be no strongly defined tendency one way or the other with respect to endomorphy. "It would appear that the level of delinquency we have sampled in this study is one which on the whole calls for, or appeals to, a somewhat higher degree of physical vigor than is represented in the college population" However it is pointed out that not only the majority of the delinquent subjects making up this study are endomorphic mesomorphs, but so are the great majority of successful men. Endomorphic mesomorphy means energetic vitality and freedom from inhibition, "two cardinal factors in success at most of the things men undertake." It should be clear thus that the somatotype *alone* has virtually no predictive value. However, if it should be established that a very large proportion of primary criminals are of this somatotype, the fact "would offer a valuable clue to an understanding of criminality, and hence to its control Until we know *who* the criminals are, talk of *why* and *how* is premature"

The mean psychiatric index for the whole group is roughly 3-2-1 ½. So far as this index goes, then, the 200 delinquent youths are on an average just barely within the psychoneurotic range

> The homogeneity of expression of the psychiatric components, with the Dionysian factor almost uniformly dominant is indeed the most conspicuous common bond in the present series Perhaps that will turn out to be the long-sought highest common factor needed for framing a definition of delinquency Possibly we shall some day define civil delinquency in terms of the Dionysian and paranoid manifestations of cerebropenia, thus establishing in fact as well as in theory the continuum of psychiatric and criminological practice.

One of the most useful findings of the whole study, Sheldon feels, may be "the clearcut fact that the boys of the lowest *t* component" (i.e., the component of thoroughbredness or of aesthetic pleasingness) "present primarily insufficiency and not primarily criminality" He concludes a discussion of both Lombroso's and Hooton's findings on the constitutional characteristics of criminals with the comment that this finding with regard to the *t* component may mean that what Lombroso and Hooton saw so clearly in their penitentiary populations was perhaps.

> . the spoor of insufficiency and not that of anything that needs to be called criminality There may be no such thing as criminality and I think it is quite possible that we will forget that concept when as a body of social scientists we at length face the meaning and the reality of human insufficiency If the hypothesis can be tentatively accepted, for purposes of discussion, that Lombroso and Hooton were really dealing with stigmata of insufficiency . then their findings not only accord well with one another but also with the (present) study.
>
> All three center the focus of the problem of crime control unequivocally on the practical matter of selective breeding

A detailed investigation of the parental backgrounds of the subjects, indicates that the parents taken as a group were delinquent in very much the same way that the boys were delinquent, with regard to the medical and mental insufficiency, the psychiatric manifestations, the alcoholism, the irresponsible reproduction, and the civil delinquency The mothers in particular tended to be large heavy women—"hefty, muscular, burgeoned, gross, obese." They are characterized also as having "low *t* and asthenic stigmata "

Since Sheldon feels that "for whatever else may be true of the delinquency I saw in Boston, it is mainly in the germ plasm Efforts to treat the individuals even if successful would . . . only push the problems on to the next generation in increasing measure" he has devoted the last chapters of the book to an exploration of ideas not on what might be done about individuals already delinquent but on what seem to be the underlying correlates *and causes of delinquency*

In considering the general problem of biological delinquency, two factors are especially noted, both of which depart from efficient biological balance One is "burgeoning," so conspicuous in the mothers of the present delinquent subjects Burgeoning is defined by Sheldon as "a gross enlargement of structure which does not serve a biological purpose but may be inclined, rather, to hinder the purpose it seems to serve" The other is asthenia which is defined as being weak, without strength It is not to be confused with ectomorphy but merely means being abnormally weak for the somatotype The author suggests that delinquency may reside in the cellular morphogenotype

> Biological attention has for some time been directed to the cell in the hope of picking up a clue to the control of that kind of balance which avoids both delinquencies—the burgeoning delinquency and the asthenic delinquency When it becomes possible to see cells in somewhat the same perspective as that in which we are now accustomed to seeing the human organism as a whole, it may be that the personality of cells will throw light on the personality of organisms This may lead

> to a new kind of psychology—or orderly description of human behavior—in which the problem of delinquency will further merge with that of medical pathology For it may be that the delinquency that matters in life is cellular, and not only cellular but deeper, within the genetic structure The cell might then be an important way station in a study of delinquency

One difficulty encountered in the study of delinquency is the difficulty of defining the term *"Delinquency is behavior disappointing beyond reasonable expectation"* is offered as a definition, and the valuelessness of social statistics on delinquency is partly attributed to the fact that the behavior of many supposedly respectable citizens operating within our currently accepted pattern of institutions, cannot on good statistical grounds be included in our social statistics on delinquency.

Sheldon notes that the way of Dionysian predation is a happy way of life, but that abortive predation is delinquency. Back of predation is irresponsible reproduction, which is pointed out as one of our greatest social delinquencies And back of irresponsible reproduction is "religious delinquency,—that is, the over-concern of religious leaders for supernatural theology and their refusal to tackle the problem of biological humanics or for that matter of any humanics Religious delinquency is specifically defined as 'failure to use religious energy in such a way as to secure, protect and guide the biological future of the species.' "

The volume concludes with an epilogue in which delinquency is defined as "a measure of the difference between what human beings are biologically and their prevailing notions of themselves " If we accept this definition then.

> The field of delinquency lies mainly in the realm of social rather than individual psychiatry and the problems presented by delinquency are inseparable from the underlying defections of social institutions Since medical and social practices are in the long run no more than translations of prevailing beliefs into procedures, delinquency is in a practical sense a reflection of the shortcomings of men's institutionalized notions, and the most compact summary of delinquency would be the most compact summary of these institutionalized idea structures Such a summary has been attempted in "The Promethean Will" under four headings or four panels In that frame of reference, four constructive proposals may offer the nucleus for a broad synchronic attack on delinquency

These proposals are, in very brief summary·

1. *First panel—economic* Discourage the transmission of excessive amounts of private wealth, thus discouraging undue concern about and arrogance because of wealth

2. *Second panel—sociopolitical.* To look war in the face and accept the responsibility of world-wide military and police maintenance, i.e., act effectively and immediately in the establishment of a central world government

3. *Third panel—sexual-reproductive.* Prepare for drastically reduced and selective reproduction "Recognize reproduction as a kind of licensed and subsidized specialty instead of laissez-faire competition"

4 *Fourth panel—religious, orientation in time.* "Rescue the religious mind from its fatal habit of intoxicating itself with theology," allowing the institutions of religion to fulfill their proper function of serving the biological future. The religious mind is the time-conscious mind, as necessary to the plan of biological humanics as life itself, but the immediate problem is to ferry it across the theologic quagmire.

There are contained within this book, in addition to a wealth of information, many valuable suggestions for future action, suggestions which may be taken well or ill by the professions to which they are addressed

In relation to psychiatry, there is the suggestion that:

> Psychiatry may become the salvation of social science When psychiatry frees itself from the mysticism of "psychoanalytic dynamics" and emerges from the acute episode of autistic thinking that has been given character by Freudian theology, psychiatrists will find themselves confronted by the job of developing an operational attack on the institutional problems underlying delinquency But human institutions both in health and in pathology are expressions of human temperament and an attack on the study of institutions must be first an attack on the study of temperament.

As to psychology, Sheldon believes that if social agencies are to play a useful part in the solution of this most difficult and most immediately important of social problems (i.e, delinquency) they must first find a way of becoming expert in the art and science of describing people It is a psychology that is needed, "but psychologists have failed timorously to live up to this implied responsibility of psychology and in consequence we have what amounts to a sort of academic lost generation of psychologists"

For social workers, there is a great deal to be learned from this book by anyone now engaged in the practice of social work or even by anyone contemplating such a career. The actual record of what the social agencies of Boston have done in regard to the 200 cases herein described speaks for itself and constitutes a more incisive criticism of present-day social work procedure than could any summary of these data by this reviewer. The currently predominant view in psychiatric social work, according to Sheldon, is based on a supposition that delinquency is mainly an expression of difficulties born of conflict, and that conflict is in turn a product of the Freudian story of socially induced fears, frustrations, and repressions "In Freudian theology the devil, or sin, is personified as cerebrotonia, the repressive inhibitory component." Such a point of view, needless to say, is diametrically opposed to the constitutional approach of this volume

As for the clergyman,—he may well read the sections on the delinquency of theology with profit. Just how he can reconcile them with much of his current practice would be difficult to predict.

A relatively brief review cannot do justice to the tremendous amount of factual data neatly packed into this book, to the brilliance of the theorizing, nor to the wit and skill of much of the writing. Scarcely a page, even throughout the case history material, which does not make good satisfying, amusing though sometimes—depending on the reader's profession and the degree of responsibility he takes in the common delinquency of our society—rather embarrassing reading. It is difficult to imagine a reader, regardless of his orientation, who will not find it necessary to revise somewhat his notions of delinquency, and who can continue to feel that the problem of delinquency is to any degree a problem which can be isolated and solved, by analytic or any other techniques, without tackling at the same time the more universal and more serious problems with which society is today faced

The most direct recommendations are that society should enforce selective reproduction, and that we should at least make a start on the kind of record keeping which will in time bring the morphogenotype and then the whole story of personality up into the full light of day It is suggested that standardized photographic records and adequate biographical summaries of even a few thousand subjects for even half a dozen generations might make it possible to define both medical delinquency and biological superiority in one frame of reference.

But above all, the author stresses the relatively minor importance of the individual delinquent in the whole problem of inherited delinquency, and the relative unimportance of even the whole problem of individual delinquency as compared to the current delinquency of society.

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Child Behavior, Animal Behavior, and Comparative Psychology

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DECEMBER, 1950

(Manuscripts are printed in the order of final acceptance)

College survivals and non-survivals at marginal test levels. Cases LVII-LXXXIV 153
By F. L. Wells

Some projective functions of simple geometrical figures. Cases LXXXV-XCV 187
By F. L. Wells

Hoarding behavior in the golden hamster (*Mesocricetus auratus auratus*) 211
By Wendell I. Smith and Sherman Ross

The development of visuo-motor performance on the marble board in normal children 217
By Loren Crain and Heinz Werner

Aspects of the psychology of meaning . . . 231
By R. W. Pickford

(OVER)

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An experiment on the identification of body odor . 257
By George K. Morlan

Instruction time in certain multiple choice tests. Cases XCVI-CII 267
By F. L. Wells

An experimental test of latent learning in a relatively free-choice situation 283
By M. E. Shaw and R. H. Waters

The sociology of perception . 293
By Arthur Child

Performance of normal and brain-operated monkeys on mechanical puzzles with and without food incentive . . 305
By R. T. David, P. H. Settlage, and H. F. Harlow

The differential decline of subtest scores of the Wechsler-Bellevue Intelligence Scale in 60-69-year-old individuals . . 313
By Charlotte Fox and James E. Birren

BOOKS 319

CRITICAL REVIEWS OF RECENT BOOKS . . 321

Lowenthal, L., & Guterman, N. *Prophets of Deceit.* (Studies in Prejudice Series.) (Reviewed by Charles A. Wells) 321

BOOKS RECENTLY RECEIVED . 325

The Journal of Genetic Psychology, 1950, 77, 153-185

COLLEGE SURVIVALS AND NON-SURVIVALS AT MARGINAL TEST LEVELS CASES LVII – LXXXIV*

The Grant Study, Department of Hygiene, Harvard University

F. L. WELLS

Two preceding papers have dealt with adjustment functions in students of superior intellectual ratings, (14) concerning "normal" individuals of the Grant Study, (15) concerning individuals presenting problems to the Hygiene Department The present paper takes up the situation at the other end of the (local collegiate) psychometric scale. The cases are selected on psychometric grounds only Only two cases from the Grant Study (LXXXIII, LXXXIV), are found in this group, as compared with many times this number at the upper end

As previously (15), the available information is presented under headings as follows:

> *a* The problem of referral as cited by the student health department physician.
>
> *b* Such data pertinent to the examination as are obtained from the referral itself, the student health department records, or any other University source antedating the psychometric examination itself
>
> *c*. The psychometric observations made in response to the referral, and previous psychometric data available
>
> *d* Comment on these findings, based largely on report at the time to the referring authority
>
> *e* Any follow-up data, based essentially on University records. Cf also succeeding paragraphs from (15) with reference to therapy, linearity, and test technique

In these cases the dominant problem is that of unsatisfactory academic status and its source, with secondary considerations in the area of career planning. The present grouping is by outcome rather than problems, which are not sufficiently differentiated. With some allowance for a borderline case, if a student had satisfactory academic status in the college when last in it, he is grouped as a "survivor" If there was unsatisfactory academic status at the time of separation from the college, he is grouped as a "non-survivor." The groups chance to be equal in number, 14 each, the two Grant Study cases naturally falling among the "survivors." The problems are of

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a sort likely to occur earlier in the academic career than those affecting the high psychometric group of (15). The group of non-survivors (LVII-LXX), is presented first, then the survivor group (LXXI-LXXXIV), followed by brief overall discussion.

Of the 26 Hygiene Department referrals, seven were given a basic clerical aptitude test (number-checking). Not one of these survived. It would however be unjust to suspect any academically lethal influence of this procedure. A more probable explanation lies in the strictly "vocational" character of this test. It would be used only where there was considerable evidence of career groping on the part of the examinee. No survivor appears to have evinced the undeveloped motivation implicit in the listing of this procedure in the test record. (LXXXIV had the test as part of the regular Giant Study schedule for that year.)

More distinctive features for particular cases, include the marked contrast of SAT/MAT against the alphas in LVII, which is not redeemed by a Rorschach pattern of more than ordinary richness, though perhaps not of the healthiest. LIX exhibits one of the least favorable psychometric situations of the group, associated with a passable academic history In LXV on the other hand, the specially low psychometric status is unrelieved by a good secondary school record, but a less exacting college seems to have found him very acceptable. None of these cases came with evidence of so heavy a handicap as LXIX, expressed in the far submarginal predictive rank. In LX, LXI, and LXVII, parental pressures appear to have contributed to the unfavorable course of events. More from a test standpoint, the notably low vocabulary score in LXII, in association with a Rorschach pattern of more than ordinary richness. The test changes recorded in the second examination of LXIV, and the dynamic questions raised. A distinctly cyclothymic disposition, without the basic personality strengths of LXXXI, weighs the balance unfavorably for LXVII; LXVIII is another case in whom a locally marginal intellectual endowment does not suffice in the presence of the constitutional (?) and environmental handicaps. A comparable though less definite situation exists for LXX.

Among the cases of survival may be cited the redeeming influences represented in well-developed Rorschach response, Cases LXXI, LXXII, LXXVII. On the other hand, not less favorable outcomes with restricted patterns, cf. Cases LXXVIII, LXXXI, LXXXIV A generally good personality setup makes an essential contribution in Cases LXXV and LXXVI among others (contrast with LXVII, LXVIII, LXX); LXXV, LXXVIII, and LXXIX show a considerable contrast of expectation and outcome

LXXX may have been saved to the survivor group by early entrance into the armed forces, on the other hand, might well have matured favorably there, as did LXXIX.

A. NON-SURVIVORS

LVII. *a.* On an obviously modest equipment took a very heavy course load, and failed badly in carrying it. No relevant clinical pathology, but how can the case be understood from the standpoint of a "separation interview"?

b. Comfortable economic status; exercise slight, individual, interest rather heavily ideational, cultural, favorable social impression "but not very forceful . . . friendly, well-spoken . . . able to get along." Grades never satisfactory and progressively less so Linearity 14 7, marked ectomorphy.

Psychiatrically, low intelligence without drive or academic habits to offset, "hard to see why he was ever allowed to come to Harvard in the first place" (though as below, the entrance criteria make him out a better risk than most *in this series*).

c. Entrance SAT +.27, MAT —2.3, *secondary school rank perhaps a half sigma low; predictive rank* 1.2 *sigma low.* Here, verbal alpha —2 6 (Directions subtest —3.8), number —1.8 Vocabulary —.37. Thurstone PMA Completion —.28, Rorschach response well developed, response number about one sigma high; special development of Movement and white space, good Originality and Organization.

d. The scores of formal tests here, give a misleading impression of the actual intellectual powers, which are probably best reflected in the Rorschach response. He appears handicapped to an unusual degree by the rigid requirements of the conventional multiple choice test. The gap between SAT and MAT represents this in part, but the comparative alpha scores suggest that this is a disinclination towards rather than a disability in, the quantitative. His academic failures are believed to result not from a basically inadequate intellectual equipment, but from failure to bring his intellect under effective discipline.

e. Administratively, the water was over the dam, and separation followed shortly. Several months later, application for readmission, with examination referral.

e'. Circumstances permitted only a partial repetition of the earlier procedures Verbal speed alpha scored somewhat better, —1 1, number slightly better, —1 4. Some spatial tests based on Kuhlmann-Binet material were rather ineffectively handled, and a picture story procedure was comparatively less well developed than the previous Rorschach response. No basis was afforded to better the impression of the previous interview *e'*. Administratively, readmission did not appear justified. Further information is unavailable, but a better degree of intellectual organization appears necessary before certain real talents can be effectively utilized

LVIII. *a*. Unsatisfactory academic record, question of ability to meet local standards.

b. Rural secondary school record good, apparently based on over-liberal standards Entrance medical examination records lower middle socio-economic status; good athletic participation, technological career plan. "Quiet, sad, few acquaintances, may need guidance" Linearity 12 9; dress sloppy From instructor's standpoint "polite, passive, obviously inadequate preparation, no conception of present requirements."

c Entrance SAT —1.3, MAT — 33 Alpha verbal —.30, Number +.92. Vocabulary range —2 3. Rorschach pattern much constricted, only notable development being among "shading" responses Thurstone PMA Completion —.6. Space analysis functions show up comparatively well; easy block assemblies + 6, difficult + 5 Zyve Exercises E and K are of low grade, but J (mechanical analysis) very good, +1 4.

d. The verbal test pattern is that which follows logically upon a good endowment with inferior preparation; note here the relative superiority of alpha number to MAT. The good spatial and mechanical functions are in line with the technological career planned Personally, a very well integrated impression, while he might improve his grades, they were unlikely to reach the level necessary to hold a scholarship Neither had such performance been predicted for him on a statistical basis, at the time of entrance. The case was thought to "pose again the whole question of weighting academic accomplishment so heavily in the matter of scholarship retention."

e. Interrupted college course to enter armed forces, reaching commissioned grade in a technological branch Later opportunity to return here, did not do so, perhaps wisely, no recent information

LIX. *a* Referred administratively as to reason for poor grades, psychiatrically seems well organized but possibly "borderline college intelligence"

b. Entrance medical examination recites an upper middle socio-economic status, symptom-free except for worries about academic situation. Perhaps under-energetic; "must work harder than he probably has in the past." Linearity 12 3

c. Entrance SAT —2 5, MAT — 24 Fair secondary school record contribute to a passable but low predictive rank. Here, verbal alpha —1.9, number + 11, consistent with above An especially low same-opposites subtest, —2 6, associates itself with a submarginal vocabulary score —3.4, among the lowest to be found in the local setting In some ways comparable to LXX, he departs largely in number-checking reaction, unusual error producing a subaverage score in the presence of good speed. There is again evidence for rather good spatial functions, nothing notable from a projective standpoint

d. Although quantitative and spatial functions appear adequate, the verbal handicap is a very heavy one for good liberal arts work Attention must be drawn to the notable amount of error in multiple choice work generally, there being no evidence that this results from over-tenseness, it is a fair inference that we deal with an easy-going, somewhat "flexible" type of mental organization likely to do his best work in a setting where tolerances of error are comparatively liberal.

e. Academic status continued unsatisfactory with separation shortly afterward A less demanding career plan, reasonably suited to his abilities and temperament, was at last accounts being implemented

LX. *a.* Doing poorly in first term here, seems immature, probably better off at University of X; should he have another try at Harvard?

b. Good academic antecedents, middle class economic status Medical history records fair athletic participation, mechanical hobbies Made superficial impression of "easy-going dreaminess," but actually more gumption, can take good care of self. Ratings include the terms assured, relaxed, even mood, dependable, controlled, leader Note of careless dress, dirty skin "Will probably have some difficulties with studies, but get by" Step-test physical fitness, high average Linearity 14 0. Early unsatisfactory academic status, lackadaisical attitude toward regulations, poor organization of study and social life.

c Entrance SAT —.35, MAT —1.8. Speed alpha much higher, +1.5 in verbal functions, —.49 for number. Vocabulary range very low in proportion, —1.5 Rorschach responses about a sigma low in number, dominated by Form of which the level is reasonably good All but three are A or Ad, over a third are P, no M or Z, slight FC. Response times rather slow.

d. As remarked at the time, "with his general immaturity the above is not enough . . . agreed that it would have been better to have taken college training nearer home . if he is not meeting requirements, believe the only circumstances under which he should stay involve the close supervision of someone who would look after him as a high school kid that he essentially is. The only reason for providing this extra attention is that we should perhaps accept some share of the mistake in his coming here, and do something to help retrieve it."

Some such supervision was actually being provided at this time The case is psychometrically remarkable for the disjunction between verbal speed alpha and vocabulary. No small part of the immaturity may have been inadequate preparation.

e Work continued below standard, and resulted in separation shortly thereafter. No subsequent information available, but it is believed that considerable home pressure had been put upon him to attempt the local curriculum No general adjustment difficulties were disclosed, or any reason why he should not perform satisfactorily in an academic environment less exacting, and in later life.

LXI. *a*. Difficulty with pre-professional training; question of shift in plans. What is the psychometric evidence?

b. Economic background rather well-to-do; slight exercise, sedentary spare time interests. Early medical career plan, pressured by parent; inapt as above, but rather confused thinking of alternatives and of his college objectives. Proposed shift of courses disallowed. Some neurotic traits. Linearity 12.5.

c. SAT —1.5, MAT + 85, Alpha verbal —1.8, number —.26. Vocabulary —1 9 Zyve Exercises E, J, K, inferior. Easy block assemblies —.85, difficult —2 6 Certain projective responses are of better intellectual level, and a very good score, +1.2, is achieved in the basic "accounting aptitude" function of number-checking.

d. There is nothing in the above findings to justify the contemplation of a graduate professional career, though it is not necessarily inadequate to passable college work.

e. Continuing academic inadequacies led to separation shortly afterwards. Good work was then done at another institution of less exacting requirements, and subsequent application to reenter was made, leading to second referral.

a'. Validity of previous findings questioned on basis of intercurrent depression at that time; check with reference to present application

c'. Alpha verbal —1.5, number — 92. Vocabulary —2.0. Rorschach response number about local average, but all are details and comparatively flat. Zyve Exercise E, now good, J still inferior, K up to local average.

d'. The general picture is little if at all better than the previous The work was noted to be fairly accurate, and fast in certain simple processes, but again only marginally adequate for advanced academic tasks His classroom performance in the interval offers a basis for more favorable action on returning.

e'. He was offered the opportunity, of which he did not avail himself. At last accounts, he was at least in training for an active, potentially very exacting type of work for which he would scarcely have been selected by the above data.

LXII. *a.* Original plan to study medicine, heavy going in college, question of capacity. Possible alternatives.

b Socio-economically marginal, sleep, athletic participation fair, fond of sports, dances, movies Entrance medical examination rates good-normal on 4-point scale, "pleasant, likeable, athletic." Many extra-curricular interests. Linearity 12.5.

c Entrance test data not available. Verbal Alpha —1.3, number —1.6. Vocabulary range —2.3. Rorschach response number about one sigma high, of at least average richness, strongest in Originality; contains an Object or quasi-Plant Movement response, as "ivy climbing up the side of a house" (Card X). Rather inferior showing in absurd sentences from the Wells-Ruesch Handbook. Especially good work with Block Assemblies, Easy +1 6, Difficult +1.2. Bellevue Block Designs, score 14, good for local group. Zyve Exercise J, inferior, K, average for local group.

d This man had transferred from a smaller institution where he probably would have done better to remain. One soon learns in this setting that a well-integrated personality is worth at least a half sigma of objective test score and with the intellectual initiative displayed he would be a still fairer risk. Against this must be set the following considerations· To accomplish satisfactorily the local curriculum would require a sacrifice of extra-curricular interests very difficult, and probably unwise for such a man to make. At best, the likelihood of his acceptance for the contemplated graduate training would be highly problematical For any reasonable career expectations in this man, the value of the "small college" degree does not differ significantly from the large.

e. In accordance with the above he withdrew from this college, without prejudice and with good morale; arranged for readmission to previous institution after brief period of employment (Graphology might be misled by this man's handwriting into inferring a person of higher intellectual level, but would probably pick up the superior general organization)

LXIII *a* On the basis of doubtful preparation, unsatisfactory academic record after passable initial work. Question of psychometric leads for directing his work here.

b. "Outdoor" rather than an academic personality type Marginal secondary school record, and predictive rank. Entrance medical examination records upper middle socio-economic status, good athletic and social participation in home environment, but a sort of "spiritual displacement" in the present one; this seems to contribute heavily to an estimate of "mediocre, unstable individual." Linearity 13.6 After some months, medical impression as "pleasant, a little shy, interesting when opens up." Later drop in scholastic work, as above, possibly in wrong type of school, should be more technological, "no loafer, good type."

c SAT —.42, MAT —.01. Verbal alpha —1.3, number alpha —1.5, simple computations especially troublesome. Vocabulary range —1.7. Rorschach pattern constricted, R over a sigma low, marked overqualification. Similar tendency is reflected in the many omissions characterizing the vocabulary responses A number checking ("clerical aptitude") test was performed without error but so slowly as to rate —1.2 Block assemblies gave much the best scores, easy +1.8, difficult +.27

d. Test attitudes amiable and cooperative, but under-energetic and suggesting low motivation. Assimilation of printed test instructions especially slow. At times self-deprecatory The general picture was recorded as one not denoting a good risk for local conditions, and bears out the previous suggestion of a different educational program, more technologically oriented

e. Generally marginal subsequent academic performance, some good spots, but as a whole unsatisfactory. Work interrupted for armed service. Active overseas career, through non-commissioned to commissioned grade. No record of further formal education, but career appears to be shaping itself along technological lines in the home environment, and under much better motivation.

LXIV. *a.* Is he psychometrically equipped for Harvard? If he returns is he likely to have more trouble?

b. Economic status lower middle. Initial medical history describes a somewhat over-ideational, asocial personality, spare time alone, nature-study, reading, attempts at writing. Dislike of exercise, good sleep habits, but fatigues easily. Step-test physical fitness, notably inferior Feminine body build. Linearity 12.0. Looked on as "very" difficult problem for psychiatrist and endocrinologist. General adjustment failure led to separation a few weeks after admission Some psychiatric care, later various simple jobs with apparently good adjustment Now seeking readmission.

c. Entrance SAT —.51, MAT —2.8; secondary school rank —1.4, predictive rank —1.8. Alpha tests closer together than SAT/MAT, verbal —1.4, number —1.8. Vocabulary practically at average, suggesting a cultural background (preparation?) somewhat in advance of native alertness, note the midway position of SAT. Thurstone PMA Completion scored similarly to the alphas, —1.5 These features are partly redeemed by a (condensed) Rorschach response of more than average Originality, though the pattern is out of line. Marked excess of Wholes, Color, Animal Movement, with deficiency in Form response. Word-association on the egocentric side; easy Block Assemblies +.56, difficult —.80.

d. It was felt that this was among the cases whose intellectual powers would succeed in this milieu, only with better personality organization than appeared to be present. "Under any normal conditions, one would say that higher education ought to be reserved for better risks."

e Was advised against returning; good employment history for something over a year, again raised question of readmission

a'. Has psychometric improved? Should we now approve admission?

c' Speed alpha verbal practically at local average. Number, —1.5. Vocabulary test now over a sigma high. Verbal subtests of Wechsler-Bellevue show standard scores of Information 17, Comprehension 15, Digit Span 9; Similarities 14; Arithmetic 12. There is too much scatter, but the summated score gives an appearance of adequacy. Rorschach response is noted as more strongly motivated than previously, with certain changes in patterning. Wholes are somewhat fewer, Details over three times as many. Color (C and Cf) is still prominent and Form level low, but Human Movement has largely replaced Animal. In content, some two thirds of the responses fall into specialized categories like Art, Myth, Map, etc.

d'. The test situation was thus more favorable than previously. To the referring psychiatrist he was cited as a "reasonable though not quite up to average risk"

e'. Readmitted (Linearity now 13 0), and made a better showing than originally, but work was very erratic and again led to separation, after something over a year Such failures occur in the presence of much higher psychometrics than here, when the personality does not sustain adequate motivation. Appeal to this factor at a conscious level, is scarcely justified for the present case One may recall the psychometric weaknesses in Bellevue scatter (Digit Span 6, 5) and in the handling of quantitative material generally It is at least as likely that the dynamics of the failure should be sought along these lines

LXV. *a.* Academic and social difficulties during first college term; should he be encouraged to continue here?

b. History of a somewhat sheltered existence, at superior socio-economic level Minimal exercise, inferior sleep habits, extra-curricular activities rather asocial. Career plan in the arts Medical examination ratings include the terms uncertain; *tense, effeminate; sensitive, inhibited, shy "not found his* legs yet, perhaps college will help." Linearity 14.1.

c. Entrance SAT —2.3, MAT —3.3. These are extremely low figures, reflected in his secondary school rank of similar order, and a sub-marginal predictive rating. Alpha verbal —1.2, number —1.6 Vocabulary range —2.3 Thurstone PMA Completion —1.1, Same-Opposite —.36. Rorschach response number about —1.2; with both Color and shading "shock," over-qualifications and reservations, regressive response contents. Of similar purport were responses to Behn-Eschenburg figures. Word-associations gave an excess of personalized responses in rather disorderly form. Noted were various quasi-feminine affectations and intonations By contrast, block assemblies rated well, easy +1.5, difficult +.85 Comment was made on long and flexible fingers.

d Noted also was the readiness with which this man grasped test instructions, contrasting with ineffective performance and much error. The general picture suggests this latter as over-reaction to stress. Also, the verbal *subtest pattern is very erratic and in an unexpected direction, analogies were* actually +.81, while mixed sentences were badly failed, —3.3. The general picture has been described as quasi-feminine, but the psychometric pattern is not so.

General comments at the time gave a dubious outlook; the problem would be to safeguard him from dangers to which his present disposition exposes him, while exposing him to sufficient influence of a toughening character "Aside from his limited equipment (which is probably higher than shows in multiple choice tests) one would not ordinarily consider that the local situation offered the proper environment for such influences to operate colleges of modest standards would probably be too rough for him though there are denominational ones where he might fit in" . Recalling a previous similar case in which this had occurred.

e. An adjustment along these lines was attempted with good results, excellent academic grades being recorded, on this basis he later sought to re-enter here.

a'. Does he now show intellectual equipment to justify his making another try here?

b'. Record of endocrine therapy in the interval, with a rather improved general impression. Readmission appears to have hinged largely on psychometric findings.

c' Alpha verbal —1.1, number —2.0. Still much error, though the subtest pattern is less erratic than previously. Vocabulary range improved, but still —1.5 The verbal portion of a Wechsler-Bellevue scale would have scored to the not impossible percentile of about 92. There was marked weakness in Arithmetic and Digit Span, fair strength in the remainder.

d' A test of the Rorschach type should have been helpful, but is not recorded. On the whole there was little more reason to expect his success than previously As there appeared to be another college where he could do "extremely well" it seemed in his own interest to return there.

e'. He continued at the smaller college but no further data are available

LXVI. *a*. Insomnia and allied reactions to difficult family situation, any test data that might help in career plan, possibly marginal material for local educational requirements.

b. Entrance medical examination, a few months previous, records no special sleep problem, but finds him "compulsive, jittery"; demeanor is "intelligent, friendly, sociable," but he is "nervous, should be closely observed." A generally normal extracurricular life is recorded, with reasonable physical exercise. Socio-economic status is comfortable, and he is well-groomed. Linearity 13 2 Psychiatric study emphasizes adjustment difficulties in both parents, reflected in this individual, hampering his college work and possibly indicating a less exacting educational environment.

c Entrance SAT —1.4, MAT — 5 Rank in secondary school, College Board examinations, and local prediction, all over a sigma low. Here, alpha verbal —1 5, with special difficulties in the directions and mixed sentences subtests. Alpha number scores practically at average, but with special difficulty in number series completion. Vocabulary among lowest observed, —2 6 On the other hand an average record is made with number-checking (clerical-accounting aptitude), and a very superior one in both easy and difficult block assemblies, +1.6 and +1.2 respectively. Rorschach pattern had a good response number, but rather low grade, no Movement or Organization, some Texture, and Form-Color.

d. This man was remarked at the time as one of an emerging sub-type of cases with marginal or submarginal academic accomplishment, with notably better quantitative than verbal test records. It is obvious that the admitting authorities knowingly took a long chance on this man, which sometimes pays off (Case LXXV), but not in this instance. With the comparatively better quantitative and manipulative test records, greater aptitude for training of a technological type is indicated, but an apparent lack of motivation makes one doubt that it will be effectively capitalized

e. Academic difficulties continued, of a level scarcely compatible with continued stay Recommendation for easier program. Military service in subordinate enlisted grade, no subsequent information.

LXVII. *a.* Subject to depressive moods, possibly with a large reactive element; verbal inhibitions, lack of normal interests; question of aptitudes with reference to career plan

b. The above problems became overt subsequent to entrance medical examination, which recites the common problems as absent, and speaks of him as "happy, stable, mature, friendly, bright enough to get along without trouble" Economically rather well-to-do, with healthy parents and sibs. Linearity 13 6. After about a year his depressive episodes brought him to psychiatric attention, and he was referred for examination as above.

c. Entrance SAT —1.2, MAT lacking; rank in secondary school, College Boards and local prediction, all around 75 sigma low. Verbal alpha —.89, number alpha + 26 Oral Inkblot responses few and restricted; somewhat freer response in writing, including Movement and Organization. Thurstone's PMA Same-Opposites about a sigma low, with much error. Word-association responses were slow, with adherence to formalized schema, mostly synonyms or opposites Number-checking (clerical-accounting aptitude) good, +.30 by local standards. Easy manipulative functions —.32, but difficult again +.34. A finger dexterity test resulted comparably to the easy manipulative series.

d. The case is somewhat comparable to LXVI; the pre-college test data are slightly better though personality integrations seem rather less good No specific aptitudes stand out sufficiently to be made the basis of career plans In general, there is equipment for pursuits demanding conformability rather than initiative. There is the recurring question of the wisdom of the educational planning that led him to seek an academic environment of the present level.

e With psychiatric and other support he got along for a few more months. Then a further depressive episode supervened, apparently more severe than previously, with feelings of fatigue and incapacity apparently more prominent than melancholy or sadness Recommendation that and decision to withdraw from college brought a prompt abatement of symptoms, attesting their reactive character in a comparatively vulnerable individual He found employment well suited to his abilities and needs as above, with later record of satisfactory adjustment to demands of armed services at enlisted level. There is some history of strephosymbolia, but its rôle is difficult to assess

LXVIII. *a* Considerable academic and other adjustment difficulties Any evidence of early malignant process? Or any special vocational assets?

b. Medical examination indicates an upper middle socio-economic status;

fair average athletic participaton, it was difficult to establish rapport with him, perhaps "self-conscious-introspective," perhaps bewildered. Later medical interview describes as "difficult individual." Cut psychiatric appointments From this standpoint, note of moderate depression, general immaturity, very low reading speed by test, parental pressure to make academic grade Subsequently an acute alcoholic episode under examination stress, together with marginal academic performance, occasions present referral. Linearity 14.0

c. Entrance SAT +1.4, MAT —.89 Very low College Board examination ratings, and predictive rank Low secondary school performance. Here, verbal alpha —1.6 (Same-Opposites only —.1), number alpha —2.1 No vocabulary score, should have been relatively good. Easy block assemblies +1.0, difficult +.11. A number-checking ("accounting aptitude") was attempted but the first trial was about double an average time. A word-association series was of normal quickness but highly personalized; showing active intellect of distinctly schizoid cast; e g., laughter accompanying commonplace responses.

Rorschach responses were well developed; R some 1.5 sigma high with emphasis on Movement, White Space and Organization, again a very schizoid pattern.

d. High SAT with low secondary grades is an academic danger signal well known to admitting authorities (good native aptitudes, lackadaisical attitudes). The present picture would not support such interpretation. As such, the lowered alphas and the number-checking response might mean depression, over-sedation, or the like. Against this are the active responses in projective functions. On the specific question of referral the present psychometric data are consistent with an early malignant process So far as aptitude assessments are relevant, they favor dealing with "things" rather than with ideas or other persons.

e. Separation from college shortly afterwards, with easing of parental pressures. Rather good record in less exacting environment. Seeks return here, referred for reexamination.

a'. Quite depressed at previous examination, possibility of considerable improvement; desires now to work along scientific lines, is return psychometrically justified?

c' Verbal alpha —73, number —2.0. Word knowledge +6, very slow, responses omitted rather than wrong. On the other hand, Thurstone PMA Completion —87. Space analysis (Conrad's structural visualization) again very good, the previous block assemblies, easy +1.0, difficult +.88 Zyve Exercises E good; J and K about local average *d'*. "The psychometric scores earned today might manage passable work here *in the presence of good general mental integration. It is not clear that* this exists. There are various indications of a compulsive tendency that forces him to spend far more than the normal or needed time over simple tests. Considerable aptitude in assembly tests, but the persistent failure in quantitative work is very unfavorable to his intended line of study at a local level . . . he might become a very good technician."

Another examiner was better impressed from a general standpoint. "Appears a different person from last year. Attitudes, manner and behavior were *those of any average boy of his age . . considerable conversation about* 'guessing if you are not sure'. Appeared to have definite set against taking a chance."

e'. The evidence was not considered sufficient to make it wise for him to return He again did good work under less exacting circumstances, with scope for the technological aptitudes At last accounts was eager to get into the armed forces, but it is not known if this was accomplished

It is suggested that the earlier difficulties, including their schizoid features were largely reactive to parental pressures toward requirements beyond his powers. "Largely," because it is questionable why they should have been beyond his powers (rich Rorschach, good SAT). The case makes a notable contrast to LXXV, for example Various psychodynamic guesses could be made, but nothing further.

LXIX. *a*. Academic insufficiency; claim of ocular difficulties interfering with study, no physical symptomatology. Questions of general adequacy and specific field.

b. According to medical history, economically well-to-do, good record of athletic participation, good social impression (speech fluent), "energy, warmth of mood, . . steady, dependable" Linearity 13 0. Referral data however raised question of psychoneurosis.

c Entrance SAT —1.9, MAT —1.5. Secondary school rank nearly 3 sigma low. Predictive rank —3 6 (!). Here, verbal alpha —1.0, number alpha —1 4, vocabulary range —2.6. A verbal Bellevue scale was strikingly high for Similarities but low elsewhere, summating to about the 90th percentile for the general population; fairly consistent with the verbal alpha. Rorschach pattern constricted, some development of Relief and Shading.

d. As a whole, this is the least favorable psychometric setup in the present material It would appear that admission had relied heavily on the good personal appearance noted above. In respect to the ocular difficulties, one should recall the relationship of the Bellevue record which depends minimally on visual factors, with the verbal alpha, which depends heavily on them. The verbal alpha score is actually among his best performances. The scores are comparatively low where academic or cultural motivation is involved, secondary school rank, scholastic "aptitude," vocabulary. Granting that the intellect shows at best no more than marginally by local standards, the academic tests probably give a less favorable picture of it than those of practical life would do.

e Psychiatrically he was classified as an anxiety state, who "should not have been admitted." Did not maintain satisfactory status. Served some three years with the armed forces, and was again seen with reference to readmission.

c'. In a different and more high speeded form of alpha, the verbal functions score —2.1, the number —66 The Bellevue response pattern is similar to the previous, the level not quite so good. Vocabulary is much better, now only —.9. The Rorschach cards produced only seven responses, and these of no high quality.

e'. It was the medical judgment that suitable basis for readmission did not exist.

LXX *a* Academic difficulties, questions of preparation for professional career, of brain damage from old head injury

b. Superior antecedents, intellectually and otherwise. Medical history recites normal athletic and social participation, rather inadequate sleep. Excellent physique, but interests tend towards the "ideational and cultural." Impressed examiner as not well organized mentally, dreamy, tense, worried, self-conscious, halting speech. Linearity 13.6

Academic and other adjustment problems referred to psychiatrist; impressed him as not having general mental equipment for local institution, referral for check.

c. Entrance SAT —1.4, MAT —2 2. Low secondary school rank and very low predictive rank. Here, verbal alpha —1.1, with special difficulty in Same-Opposites, —2 4 Number alpha —.92, with reasoning and series completion giving most trouble. Vocabulary range very low, —2 4, in the presence of superior background Rorschach response might rate average for richness, but complicated by much shading, "color shock," anatomical response. At lower levels, evidences of better intellectual functioning; seven digits repeated backwards, better than local average score in number-checking, practically without error.

d The head injury took place in early childhood, and no evidence is available of how earlier equipment compares with present. Organic involvement cannot be inferred from the internal evidence above, but as suggested, the equipment is no more than marginal for college work. The social impression was of a better integrated individual than might well be inferred from the Rorschach response. There was evidence, not brought out above, for some mechanical aptitude, but not of the mathematical ability necessary to exploit it. Little justification for contemplating professional career. Some persons no better equipped do survive as undergraduates, but the risk involved on both sides is of problematical wisdom.

e. Psychiatric conclusions were of inadequacies secondary to academic insufficiency, "ill-advised to come here, worse the longer he stays." Subsequently left the institution, after serving in the armed forces entered business employ, but not known in what capacities.

B. SURVIVORS

LXXI *a.* Scholastic difficulties, Department referral with reference to capacity for local standards.

b. Medical examination recites marginal economic status, considerable athletic participation, enjoyed, good sleep habits; social life apparently rather restricted. Made excellent general impression: "Leader, friendly, natural." "Swell boy, genial, anxious to do a good job; very likeable, should do well." Linearity 13.0. However, he missed the first hurdle, and came to attention, apparently on own initiative, as a result.

c. Entrance SAT —1.7, MAT —2.4. Predictive rank about 1.5 sigma low, and no very creditable secondary school record. Here, alpha verbal —1.5 but analogies subtest +.07; alpha number —.35 only, conspicuously reversing the SAT-MAT trend. Vocabulary submarginal, —2.3. A somewhat richer than local average Rorschach pattern, with chief strength in Organization. Certain spatial tests were well performed.

d. The multiple choice evidence, and the secondary school record, presage failures; to counterbalance these are the evidences of specially good personality integrations, and the comparatively good projective evidence. Discounting the MAT as so largely an achievement function, there is a pattern that might lend itself better to a technological type of training.

e. This man pulled out of his difficulties promptly. Shortly afterwards joined armed forces where trained to commissioned rank. Returning home three years later, is described as "carefree, well-adjusted boy, possible scholastic difficulties." These do not materialize, he maintained a close to average record until graduation, a notably creditable performance for one starting with the handicaps attributed to him, and illustrating the academic asset of a well balanced personality.

LXXII *a.* Scholastic difficulties comparable to LXXI, question of adequate equipment.

b. Medical history recites marginal economic status, unsatisfactory sleep and eating habits Linearity 12.4. Some evidence of over-sensibility, hyperactive under examination, "ideational activity beyond apparent capacity to sustain at good levels" Low ability, good ambition, distractions, not enough time for study. Early placing on probation.

c. Entrance SAT —.58, MAT —2 1. Predictive rank marginal, about —1 5; College Board average and secondary school rank about —1. Here, alpha verbal fairly up towards average, — 38, number —.78. Vocabulary practically at local average, —.08, while Rorschach gives a comparatively well developed response, but with decay and disruption motifs "What would happen if" response is again fairly good, suggesting another instance of disjunction between multiple choice and "open end" response

d. It was remarked at the time that the level of creative activity would make it "under ordinary circumstances no matter for surprise if he made the grade here" He was trying to carry too heavy an outside load for his moderate capacities, leaving inadequate reserve. "Without this, it is believed that he could and would do much better than his admission scores indicate."

e. Grades continued unsatisfactory, and he repeated a year. After several months in the armed services returned, and did considerably better, with several honor grades, and only one below average. Graduated in course Maturation under the armed services experience, in a personality organized to react to it in this way, seem a suitable interpretation of the favorable outcome.

LXXIII *a* Off to a bad start academically; seems "quite well organized" but this and pre-entrance data raise question of ability to meet local requirements.

b Medical history recites lower middle socio-economic status, fairly active athletic participation, technological career plan. "Average, normal, likeable boy," no special personality difficulties Linearity 13 6.

c Entrance SAT — 55, MAT — 56 Low College Board Average (—1.3) and Predictive Rank (—1.9), but substantially average performance in a very good secondary school Here, verbal alpha —1.9, weakest in analogies, number alpha — 35, weakest in number series completion. Vocabulary range —1 3 In the Rorschach pattern, nearly one-third are plants in a fair average response number There is a great excess of wholes, as 3 8/1, and the form level appears inferior, with a tendency to overqualify. On the other hand, there is good systematic response to a projective test of the "what would happen if" type Easy block assemblies +.73, difficult —21.

d. The formal intellectual status is marginal for the local situation, but intellectual energy and spontaneity rate better, and this is able to compensate for deficiencies of a more formal sort Compare the low rating in the multiple choice tests, to the entrance and here, with the average secondary school record, above. His own statement is that he has merely not been working hard enough, but in fact he has been carrying a heavier course load than necessary, and been under other disadvantages. Again the impression of a well-integrated personality, and a program in line with the best abilities. (This man is a fair type specimen for the Survivor series as a whole, the better general personality organization offsetting the intellectual limitations.)

e. The subsequent academic career was checkered, but he managed to survive Indeed some of the later work was of honor grade, and he graduated in course, maintaining his career objective.

LXXIV. *a* Has not done well in secondary school or here. Does he have "average Harvard intelligence?"

b. Medical examination records upper middle (professional) antecedents. Discouraged from vigorous athletics on basis of supposed heart condition (college authorities did not find this). Sedentary recreations, not especially social, impression of laziness, not unmixed with anxiety about college, into which pressured by parents Linearity 13.2.

After brief spurt, academic let-down; to physician "seemed peculiar, shy," arrangement to see psychiatrist; further suggestion of parental overdomination, desires to get into armed forces.

c Entrance SAT +.56, MAT —1.4. Verbal alpha —1.8, marked deficiency in analogies subtest, —3.1. Number alpha —2.1. Vocabulary +31 Projective work of fair richness, considering slight energy output. Thurstone PMA same-opposites —1.5, completion —.82.

d. Demeanor markedly asthenic, with slow tempo, especially slow to take in test directions, questioning and comment on work, but this seemed expressive rather of "irritable weakness" than of an energetic attitude. So much does this contrast with his entrance psychometric and secondary record, that "a different person might be involved" His chances for academic success were at entrance assessed close to average; it may be noted that the slight projective evidence is also of this level; the deficiencies are in the "objective" functions.

e Reasonably satisfactory record in armed forces, technical combat assignment, non-commissioned grade. (Later, various jobs for perhaps a year.)

Returned to finish undergraduate work Medical examination records "meek, quiet, unimproved, no direction in life, neurasthenoid makeup." However, academic work improved from barely satisfactory prewar, to honor grade on graduation. Intercurrently various short-time employments. Subsequent medical examination records appraisal of personality segments averaging D+. "Timid, shy, but with insight, likeable," can use help

Attempted graduate work, but did not make a go of it. Psychiatrically classified as "atypical depression" (Linearity 13.8). Left graduate school, with plans for several months' work, then to return. Mood fluctuations, relatively cheerful at this time of academic failure

Despite the asthenic reaction type described, seems to have adjusted better to the more rigorous demands of the armed forces than to academic life. Cyclic variation in efficiency appear capable of accounting for a large part of the surface inconsistencies in the above account. The academic status at the time of graduation would justify attempting graduate work; but it seemed impossible for him to sustain this level. Only a moderate degree of success in this area can be foreseen.

LXXV. *a* Question of ability to meet local academic standards, and in what direction there is the best chance.

b. Medical examination indicates upper middle socio-economic status; no athletic participation, hobby in entomology, abstemiousness in alcohol, tobacco, little need for medication generally; good sleep; general impression as relatively "unintelligent . . do not understand how this boy got into college." Academically recognized as a marginal case for admission, minimal in reading ability tests; a "plugger," but with complete lack of intellectual experience; "pretty hopeless"; but again, doing better than expected. Physical coordination also notably lacking. Linearity 12.7 In subsequent report by *another physician, "do not see why accepted . . stupid, stubborn, suspicious."* The actual predictive data were submarginal, though the secondary school record itself had been well within limits.

c. SAT —2.3, MAT —2.2. Verbal alpha —2.2 with subtests spreading widely; Same-Opposites —3.0, Mixed Sentences only —.1 Number alpha —1.6, subtests range, Addition —74, Reasoning —2.1. Vocabulary range —2.6 Rorschach response of better grade, above average richness, considerable Shading, Color response rather disorganized The above motor difficulties contribute to an extreme spread in block assemblies, easy —3.3, difficult —.28.

d Clearly no differential recommendation of an academic nature could be based on the above record It was seriously doubted that this man should remain at Harvard "and though he may have the ability to do work of a nominally collegiate grade, the value of such a program is highly problematical."

e. Psychometrically the above remarks may be justified; clinically they are much less so, because of (*a*) a passable record in an exacting secondary school (*b*) an actually satisfactory academic record in college up to the time when seen Note that the one major psychometric function giving a fair reflection of this apparent capacity is the Rorschach richness grade. The subsequent academic performances were an improvement over those when seen Some published writing has been done, and the career is developing along educational lines. Psychometrically, the case is an outstanding example of multiple choice failure to pick up intellectual abilities, though it is only fair to recall that other criteria had not done much better in this respect. The scholastic records and Rorschach response have fairly done so, but exceptional dynamic factors must also have been present.

LXXVI *a* Satisfactory academic record over three years, question of career choice

b. Notable for good social adjustment, upon schooling begun relatively late, and after a somewhat difficult childhood. Entrance medical examination notes fair athletic participation; an individual pleasant, frank, enjoying people, able to take care of self despite some physical disability Some over-reaction to noise A consistent local average rating in various predictive functions.

c Entrance SAT — 15. Verbal alpha —1 6, number —2.1, nothing outstanding in the subtest pattern Vocabulary range much higher —.1, near the average status reported for SAT. Rorschach responses again rate local average for development, chiefly for Color and Originality. A word-association test was distinguished by excessively slow response, with relatively personalized content.

d. This is one of the instances where emphasis on speed, as in the alpha series, is particularly misleading as a gauge of intellectual function. Assimilation of test instructions took exceptionally long; and the vocabulary test, while rating average, took about twice the usual time to accomplish. There was also the over-action to incidental noises, previously noted. The case is still an outstanding one for the overcoming of difficulties by exceptional application.

e. This is thrown into stronger relief by scrutiny of the academic record, which is well above average, and shows consistent improvement with the years Nor was this gained, as is sometimes the case, by a sacrifice of extracurricular values, both social and athletic participation is well above average; subsequent responsibilities in the educational field. In appraising this individual the tests used were especially out of line at two points, so good an intellect hardly ever responds so slowly, and a socially so well adjusted person ought not to produce so personalized a pattern of word-association.

LXXVII *a*. Improvement after a marginal academic start, interest in verbal and social rather than natural science disciplines, question of psychometric confirmation in aptitudes.

b. Medical examination recites rather well-to-do economic status, good secondary school preparation, fairly active athletic and social life. Rated as a stable but somewhat hyperactive personality type. Linearity 14.1. Academic history as under *a*, consistent improvement through the course, final status well above average.

c Entrance SAT —.8. Verbal alpha — 61, Same-Opposite subtest score highest +.75, Mixed sentences subtest lowest —1.9. Number alpha —1 6, with similar subtest spread, simple computation + 71, number series completion —2.7 Vocabulary range —.37, taking some twice the usual time. Rorschach response of comparative richness, displayed in Movement Color, Organization, R about +.8, Word-association response slow and markedly on the personalized side A test similar to one already mentioned (15), response to geometrical figures elicited effective descriptions, no symbolism.

d. Behavior in the test period described as "hypomanic"; consistent with above. Elsewhere described as alert but lackadaisical. Thus the Zyve Exercise E elicited responses curiously naive for one with the present educational background. It was felt that while formal tests were generally below local average, the energy and "capacity for amiability" together with talents he does have (cf Rorschach response) appeared adequate to reasonable success along lines of expressed interest.

e As noted, they were adequate to above average work at graduation Commissioned in armed forces, active service overseas. At last accounts, in a business situation for which apparently well adapted.

LXXVIII. *a*. Left college for lack of interest, but some months later, with an access of motivation, desires to return. Question if he has the needed academic aptitude, and of any special abilities

b. Medical history indicates lower middle economic status, makes good social appearance, rather little athletic participation, but very good adjustment to war service, and prospect of similar adequacy in college. (Linearity 12 9). Another interviewer was more skeptical of the personality organization and a number of minor college maladjustments rather bore this out. Initial grades unsatisfactory, contributing to separation.

c. Entrance tests not the usual ones, estimated as verbally one sigma low, mathematically not less than three sigma low. Here, speed alpha verbal —.85, number —1.2 Vocabulary relatively good, — 23. Verbal subtests of Wechsler-Bellevue rate unfavorably, information highest, summating to a percentile rating of 85; though a standard score of 15 is made with Block Designs. Rather impoverished Rorschach response. The Kuder profile varies from less than 10 in Mechanical and Competition to about 97 in Persuasive

d. The pattern of abilities is academically marginal, adequate only under very favorable conditions of application. Again it is doubtful if this college was the best choice for him, and his coming here may have "stimulated his aspirations beyond their optimal level." On the other hand he appeared strongly motivated, and to have at least an intellectual insight into previous difficulties. No evidence for special aptitudes sufficiently clear to be vocationally significant In appraising his academic chances by test one might give special weight to the near local average vocabulary development It was suggested that if he were to return, "any further failure to meet academic requirements should result in definite separation"

e. He was readmitted, and during the succeeding months did notably well, a majority of grades being of honor level, he claims "without working very hard." There have appeared some strong artistic career interests that were missed in the Kuder profile. More recently the academic performance has fallen off a little, but is still satisfactory. As a favorable "upset" of test indications, this case may outrank even LXXV, LXXVI, since the evidence as a whole points to a rather less stable personality in this case

LXXIX. *a.* Academic failure possibly associated with lackadaisical attitudes. Estimate of capacity for higher education. Question of schizoid traits in projective response.

b Medical history recites upper middle economic status, and interest in fairly active recreations, though there is other indication that these are not especially implemented Sleep appears inadequate. Is ascribed such attitudes as uncertain, bland, dreamy, lacking initiative. "Slow moving, fair intelligence, good likeable boy, mediocre, unobtrusive" One or two compulsive traits were psychiatrically noted. Linearity 13.8.

c. Entrance SAT —.73, MAT —1 1 Secondary school rank a sigma or more low; Predictive rank about two sigma low. Here, alpha scores reverse the SAT-MAT trend, verbal — 72, number +1 2. (Not the alpha test uniform in this presentation, but one subsequently designed, with more and uniformly easy items, termed "speed alpha") Verbal items of Wechsler-Bellevue were weak in Similarities, but globally achieved a score at the 97th percentile. Both Rorschach and word-association patterns gave a normal picture. In certain drawing tests adapted from the old Kuhlmann-Binet scale, a disproportionate amount of corrections and/or errors appeared, pointing to an impulsivity; this trend was absent in the easy alpha items. Writing pressures notably heavy

d. In the course of this examination he reported a secondary school record of considerably extracurricular accomplishment, athletic and administrative, which the above record perhaps understates. A fairly definite career choice was expressed. The present test picture is somewhat more favorable than the entrance record. He was at this time described as a much more "somatotonic" type than usually seen in this setting, "and these temperamental qualities, *with his limited intellectual equipment, may be at the bottom of his* dissatisfaction with Harvard" Cf Fink and Cantril (4)

e The academic record of this period would have been hardly adequate to survival. After a period of creditable service with the armed forces, "good with the men under him," he returned Medical examination again finds him "unsure," but appraises him as a reasonable risk. (Linearity now 13.7). At this writing the subsequent academic performance has been satisfactory

LXXX. *a* Psychiatric diagnosis of fatigue and anxiety state. Has he capacity to do college work?

b Economic status lower middle to marginal; good amount of sleep and fair athletic participation, physically fit for any athletics, good physical fitness test On the other hand, undernourished, work and study regimes interfere, in medical examination "bewildered, doubt if will shine either in marks or socially"; "over his head at Harvard." Linearity 14.0

c. Entrance SAT —2.7, MAT —.47. Alpha verbal similar, —2 8, but alpha number only — 16. Deficient word knowledge can account for the SAT; vocabulary also tests —2 8. Spatial functions were better organized: Easy Block Assemblies scored +.8, difficult + 14. Thurstone PMA Figures scored + 64

d. Marginal college status had been foreseen despite reasonably good school record, slightly above local average Demeanor during tests notably inhibited; "one of the limpest handshakes yet experienced", minimal spontaneous talk. With this all-round equipment, and his general situation, there *is no reason to expect satisfactory academic status in the present setting*

e. The sequel places this case among the others where a limited intellectual equipment is offset by intense application, indicated in the secondary school record and noted at the time of the tests. Work done was sub-average but sufficed to survive the first year when he entered military service. Ther is evidence that his general integration were much improved thereunder.

A technical lesson of this case is not to leave uncovered so large a sector of intellect as is included in the projective functions. Rorschach work for example, might have thrown a very desirable light on an academic performance so notably above the indications of verbal "objective" tests.

LXXXI. *a.* Seems well organized, but having difficulty with course vital to career plan. Does he have intellectually what it takes?

b. Medical history records a comfortable economic status, with a good secondary school record including various outside activities, of a non-athletic nature. Impression "well adjusted, intelligent, polite . . a pleasant extravert." Linearity 12 9

Psychiatric reference on the basis of anxiety reaction following an examination. No somatic symptoms, referred as above

c. Entrance SAT — 68, MAT at average. Secondary school record, predictive rank, and college classroom record, all excellent. Here, verbal alpha —1 2, number alpha — 17 Zyve Exercises EJK of the "scientific aptitude" test, all singularly low, somewhat hurried Block assemblies on the other hand good, easy +1., difficult + 6. Rorschach response number over a sigma low, with two refusals (IV, VII), constricted, rather more Color than Movement.

d. The preentrance data should leave little doubt of inherent capacity for the career planned, and the psychometric problem is really limited to the question of an episodic reduction The verbal alpha score is marginal, but the number not greatly below MAT The low Zyve record gives one pause, but is partially offset by the good manipulative scores. The academic work to date is much better than predicated in any available tests, and the sum total affords no basis for discouraging the career plan. In the interest of securing the desired professional training, however, the present academic accomplishment should be well maintained.

e. It was thoroughly maintained and the desired professional training duly completed, in the middle third of this highly selected group. The reduced test scores obtained here were clearly *invalid* as indicators of his intellectual capacity; whether they were *representative* of an episodic reduction under the anxiety condition of referral, remains uncertain

LXXXII *a* A history of previous marginal academic performance Active war service leading to various somatic complaints, and subsequent separation from service. Readmitted to college, but symptoms interfere with study. Question of psychometric setup with special reference to brain damage.

b Economically upper middle, medical history estimates as "good all-round boy, may have academic difficulties" Record of an unusually low reading test. Medically OK'd for readmission after war service, with previous academic reservation Linearity 12.6.

c. Entrance SAT —2 3, MAT —1.7, class rank about a sigma low, predictive rank —2.1. Here, verbal alpha —.85, number —1.1 Verbal portions of Wechsler-Bellevue yielded outstanding Digit Span, very good Comprehension, but other features to summate to a percentile of 90, fairly consistent with the above. Rorschach responses were few, but of fair development for their number. Fairly good scores were made in certain spatial tests, Bellevue Block Designs score 14, Bellevue Digit Symbol 13, Harvard Block Assemblies easy —.19, difficult —.40.

d. No basis for inference of brain damage could be found in the scrutiny of these records. While an easy "fatiguability" might be seen in an unusually early giving up of the Rorschach cards, other persistent effort was well carried out At this time he was apparently improving his academic status somewhat, and this was associated, in the examiner's mind, with the appearance of a specially good personality setup, as in others of the present cases

e. Shortly afterwards left the College, recorded to be in good academic standing Fragmentary information suggests professional preparation elsewhere

Of the 250 odd cases selected for participation in the Grant Study (5) there were two who in psychometric status were fairly comparable to the others reviewed in this paper. By definition there was no "referral problem" They are included as illustrations that the criteria of Grant Study participation were not impossible to these psychometric levels, and because account of them can be based on more extensive information. The selectional policies of the Grant Study led to a much higher proportion of the upper collegiate intellects, as mentioned elsewhere (15)

LXXXIII. *a. Antecedents,* traceable for several generations, appear to have maintained on both sides a rather high average of intellectual and socio-economic status Immediate economic situation is comfortable, but it is questionable if the present sibship will sustain the average of the antecedents. Moderate athletic participation, no special extracurricular pursuits or social interests. There is sensed a certain social backwardness which may be a function of the superior intellects with whom he is largely thrown. Opinions of various others stress moral and social qualities ("diligence," "cheerfulness") rather than intellectual ones. A lack in the latter respect seems to impress most observers Rated academically in the lowest third of his secondary school. A very experienced observer, however, accurately forecasting his college future, felt that persistence and resolution would keep him in a satisfactory status. Body-build is predominantly mesomorphic, with ectomorphy the least marked (Linearity 12 5) In the general personality setup, somatotonic, viscerotonic and cerebrotonic traits seem to follow in the corresponding order Assigned Outstanding Traits· Vital Affect, Practical Organizing, Pragmatic, Self-Driving, Inhibited Soundness Class A.

c Entrance SAT —1 6, MAT omitted. Predictive rank —1 8 Secondary school rank, College Board average, Freshman grades, all more than .75 sigma low A somewhat different alpha procedure was used but the scores all are of the order of —2 Directions and Analogies subtests gave particular trouble. Vocabulary scores —1 6, projective response mediocre. Easy block assemblies —.97, difficult at average. Word-association pattern normal, and about average quickness

d. These and other tests less readily quantified confirm the intellectual impressions recited above, but are wholly without prejudice to personality balance. Attitudes are recorded as of good energy and verbal freedom, marked amiability, a little lacking on the side of confidence, understandably so in an area where he would have reason to feel that he would make far from his best impression.

e Psychiatrically, he was summed up as an "amazing combination of common sense and emotional stability," with regret that with these qualities the intellectual equipment should be so limited (it appears still of course within the upper tenth of the population at large).

Academically he did about what was predicted for him, not up to average, but staying with good consistency inside of passing limits.

Overseas war service in non-commissioned grade, along lines suited to aptitudes. A difficult social and physical environment seems to have been excellently supported, many of his comrades broke down. On postwar interview here it is said of him, ". . is, as I remember when I last saw him . . deeply conscientious, extremely literal . quite lacking the light touch . war career required a good deal of hard plodding and determination; but then he is quite capable of pushing himself and enduring a great deal " (An extraneous source reports an act of outstanding courage and leadership during this period.) No doubt had the makings of an excellent officer

Takes a manufacturing position with supervisory responsibilities; permanent career plan. Good marriage. Unusual prospect of personal success and social value.

LXXXIV *b*. Antecedents show improvements in socio-economic position, now largely college-trained, including professional activities. Main emphasis on business. Comfortable economic status. Seems to have stood relatively well in early school work, though least good where there were special demands on the use of English, spoken or written. Lack of athletic ability an early handicap, but later, a special accomplishment in this field, as well as scholastic superiority, offset resulting inferiority feelings. Chief problem is with social relationships, in which the language difficulties play a part.

Career plan however involves much dependence on language; is of long standing, and with a motivation that outweighs the obvious handicaps. Though at a modest level, principal accomplishments are in dealing with ideas, chief interests in the ideational and social. Comparatively little ability or interest in dealing with "things."

Body-build slightly on the mesomorphic side, equal endo-and ectomorphy. Linearity 13.2. Many "disproportions" of body-build. In the general personality setup, cerebrotonic traits predominate markedly, with somatotonic traits least developed. Assigned Outstanding Traits Basic Personality Highly Integrated, Practical Organizing, Pragmatic, Bland Affect, Self-Driving, Inarticulate. Shy might well have been added, and the basis for Practical Organizing is less clear than one could wish. Soundness Class of A, might have been B later.

c. Entrance SAT —38, no MAT. Freshman grades at average. Here, alpha verbal —1.5, number —2.7, though there are relatively good performances in the high level subtests of analogies and number series completion. Vocabulary —63. Rorschach response number was some 1.5 sigma low, and they were not well developed. Number checking —1.3. Easy block assemblies —1.4, difficult —1.8+, there being two failures of assembly.

d. Attitude towards the test was described as "very cheerful, happy-go-lucky, easy-going, no special reaction to failures, and a little inclined to disregard test instructions." There is a tendency to discount differences (in motivation) of this order, as affecting the representativeness of scores. Speeded tests would be especially affected by this factor, and it is the preponderance of these, with the only average projective response, that gives the unfavorable showing. The secondary school work and the SAT appear altogether within limits. One is here entitled specially to suspect the validity of speeded tests in assessing intellectual capacity beyond the speed function itself. It is clear that no conspicuous ability is involved, but the present results again suggest those of LXXV, LXXVI.

e. Actually this man did rather better than average college work, though with limited extracurricular participation, and persistent problems of social adjustment. War service overseas, in enlisted status, essentially office assignment for which reasonably suited Since, graduate study according to original career plan, with excellent motivations, duly completed.

Technically, the chief interest of the case is the comparative failure of immediate test situation in the Study to sustain the valid appearance of the good secondary school record and the SAT, save as the projective work would have put the moderate ceiling on academic accomplishment, that was the event. Subtest analysis also offered a more valid picture In any event, motivation has carried him well beyond the discernible test aptitudes.

C. Discussion

In respect to various functions examined; as regards SAT and MAT, the difference between survivors and non-survivors is negligible. The survivors show some trend towards better work in secondary school The data on College Board averages are insufficient for comparison; the predictive ranks show an understandable trend in favor of the survivors, though the difference is by no means "significant." Linearities are equal in average, the variability a little greater among the non-survivors There is a trend toward lower economic status in the survivors This may be a factor in stronger motivation to survival, a part of the same process elsewhere expressed in the better academic performance of public school students than is found in the average from independent schools (9).

As to present test functions, no difference can be claimed for verbal and number alpha; indeed the nearest approach to a trend is toward lower number score in the survivors There seems to be more meaning in the comparison of vocabulary range, which runs distinctly higher in the survivors. This is of all the present verbal functions the most heavily weighted with achievement. Verbal functions are somewhat weighted in the liberal arts curriculum, and the difference may represent a greater intellectual drive and/or perceptivity, contributing to academic survival.

One would expect this to show in the Rorschach responses, but it hardly does so Neither response number, nor general dilation departs appreciably from the local mean in either group From a qualitative standpoint, the responses of the survivors are in no way "healthier" than the others (should they be?), they seem to vary more between extremes, as in LXXXI who refused two of the cards, and LXXII whose responses were loaded with decay and destruction motifs, and LXXVII, who gave good Movement, Color, and Organization though weak in Form level and tending to overqualify.

Psychometrically then, the survivor and non-survivor groups are more striking for similarities than for differences Yet it is not unlikely that factors n past history, and such data as economic status, word-knowledge and the like, would lend themselves to serviceable refinement of the now available configuration of prognostic "signs."

Larger issues concern questions of educational practice that are exemplified in these cases A recurring theme in referral and discussion, is doubt whether the man should have come to this particular institution, cf LX, LXII, LXIX, LXX, LXXX. Among 260 other students seen during a later 20 *months' period*, "*should this man be at Harvard*" *was in effect, the dominant* referral problem in 18 percent

The question has a qualitative as well as a quantitative aspect. "A student went to Amherst when he should have gone to Bates, to Bowdoin when he should have gone to Yale, to Williams when he should have gone to Rensselaer. *Mistakes of this kind are so easy and so costly that one wonders* why practically no safeguards against them have been developed" (12).

The post-war situation has brought into sharper focus the whole problem of differential aptitude for higher education (2, 3) Certain unpublished data accumulated in another connection (12) exhibit relevance here also Their basis is the educational relationships of Army alpha scores in World War I (sample 48,102 cases, 6, Table 281), and of GCT's in a 700,000 odd case sample from World War II, men received at replacement training centers six months, May to August, 1942 (whites only).

The 28 cases cited for this paper illustrate only too well the limitations of the multiple choice test in assessing educational potentialities, yet multiple choice furnishes substantially the only data available on a global scale, and may be considered valid for the mass judgments involved A *corps d'elite* cut-off point for higher education by traditional standards, is represented by the lower limits of GCT Group I, including about the upper 7 per cent of the population, in Army alpha terms approximately a lower limit score of 135 (1). In the World War II sample observed, 38 per cent of those having "four years or more of college" had scores in this GCT Group I The remaining 62 per cent of the "four years college" group were intellectually less favored. In the above World War I sample, those having four years or more of college included a larger proportion of these high scoring individuals, 57 per cent of this college group were of alphas 135 and over, as against the 38 per cent GCT I's of the above World War II sample.

Conversely, one should consider the proportions of all the high scoring individuals who have four years or more of college. In the above World

War II data, it appears that only about a quarter of this GCT Group I actually completed college The proportion of the total World War I group with these high scores who completed college was smaller, about 17 per cent.

Accordingly, there has been in the intervening period, a considerably wider diffusion of education bearing the name of collegiate. But a smaller proportion of those who receive this education are in the top bracket (38 per cent against the former 57 per cent), and many in the lower brackets received this education to the exclusion of others in the upper In the World War II sample, the number in GCT Group I whose record stopped short of completing college, totals slightly over 37,000 The number in GCT Groups II, III, IV, V who completed college including those with graduate work, totals about 21,500. For the Case LXIV, LXV, LXVII, LXIX, who is admitted to college a potential IX, X (13), XXVII, XXVIII (14), is kept out.

Recently, Tilton (10) reports at a more general level on a procedure equating World War I Alpha and Beta averages with those of GCT. It is found that the mean World War I performance is such as to be expected of Grade 5 1; the mean World War II performance being that of Grade 7.3. This difference he finds less than that to be expected from the difference in median grades actually completed, given as 6.8 for World War I, 10.5 for World War II. Tilton mentions "schooling of poor quality," but favors the view that the tests do not have enough achievement factor adequately to reflect the schooling involved There seems to be the third possibility (all may operate) as above suggested for higher education, that the grade-values have been inflated, that Grade 8 for example, does not now represent the degree of intellectual alertness or achievement that it did at the time of World War I. "A high school diploma is looked upon as the right of any American who can read and write, and who has the time and desire to go through the years of high school" (8, p 11)

On the other hand, findings reported by Tuddenham (11) would lend themselves to a more favorable view These findings denote, for tests of the alpha type, surprisingly higher performance in the World War II population than in that of World War I An alpha score of 130, reached by 9 per cent of Bregman's (1) World War I population, is reported for 30 per cent of Tuddenham's World War II population. There is no ground for supposing a "genogenic" improvement in this function during the period in question, and in the absence of an unlikely sampling error its source should lie in the cultural changes of the interval Which in turn means a larger rôle of environmental factors in tests of this type than has been implicitly supposed. (One recalls the similar issues raised in the Iowa controversy of 10 years since.) It may be remarked that SAT/MAT performance of public and independent school students are, locally at least, practically equal, despite presumptive cultural advantages for the independent school group But the public school group will have been more selected for intellectual qualities, and technological developments of the past generation will have brought the intellectual stimulation of this economically less favored group, to nearer the level of the more favored. The best psychometric criterion of this "democratic assimilation" ought to be vocabulary range, with its essentially achievement character. According to Tuddenham's results, it would not be surprising if the 1916 Stanford-Binet Vocabulary list scored 65 today in a young adult, where it scored 50 when the test was issued.

What such increased scores would mean in terms of "effective intelligence" is another and more difficult matter. We cannot say how much more "effectively intelligent" is the recruit who scored 130 alpha in 1943, than the recruit who scored 86 alpha in 1918. The cultural gains denoted are largely restricted to the manipulation of verbal-numerical symbols, and it is amply clear that these processes are an unsafe guide to assessments of broader adjustment functions Yet it is fair to hope that the gain is somewhat broader than is represented by increases of mere multiple choice test scores It had better be, *if equalitarian cultures with the present spread of individual* differences, are to long survive in an atomic technology.

Question has also been raised concerning relative attrition rates in college, *of these upper and lower testing* groups. In the World War I sample, the number of cases listed for any degree of college education, is not quite 1100 for the upper group, a little over 2100 for the lower group. The upper group shows attrition of about 20 per cent of its number for each of the first three years; some 40 per cent reach four years or more of college. Of the lower group nearly 40 per cent do not show survival beyond the first year, or an additional 30 per cent beyond the second. About 16 per cent complete four years or more The virtual difference is probably greater than these figures, since the lower testing group would tend to gravitate to less exacting institutions, where their survival would be longer.

For World War II, available data (7, vol. VI, Table 11) show the percentage of survivors at each educational level (highest school year completed) who fall into successive scale divisions of GCT ($N = 110,959$) In an upper group are included those of GCT score 130 and over, plus a correction to approximate an upper 7 5 per cent For the four college years the successive percentages who are found in this upper group approximate 20, 25, 30, 37. Comparable percentages from the World War I sample for the four college years are 21, 27, 35, 56. That is to say, of the 707 men who had four years of college, 398 had alpha scores of 135 or over. Thus, World War II offers a decreasing proportional representation of the upper group; a higher survival rate, and lower attrition rate for the lower bracket. In World War I not quite half of those completing four years of college were in the lower bracket; in World War II not quite two-thirds.

To speak of "a college education for everybody" is simply a crude way of stating the democratic ideal that everyone should receive whatever amount and kind of education will profit him (and/or society) most. There are comparatively few for whom this stops at 14 years, or for whom it extends beyond 20. Considerable qualitative diversities are called for, in which aptitudes play some part and motivations apparently more. It appears that progress toward such an ideal requires various compromises with other phases of an equalitarian social philosophy.

In sum, the educational ideal of our culture is that everyone be trained to maximize his capacities. This cannot mean a baccalaureate in liberal arts for everyone, in any traditional or present sense; but it probably does mean that many individuals would profit by more and more purposefully directed education than they now get (and a few by less). Apparently in more than occasional cases, some of which have been reviewed here, the "honorific waste" motive carries liberal education beyond its due limits. It may be seen from the example of other cultures that state-supported programs can do excellent work of this sort where the art of government is itself well matured. And it is now clearer than in 1943 that "in a world of competitive cultures, national or ideological, the maximizing of abilities, in the technological and social relations fields especially, is a condition of survival" (12).

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SOME PROJECTIVE FUNCTIONS OF SIMPLE GEOMETRICAL FIGURES: CASES LXXXV - XCV*

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A. DESCRIPTION OF PROCEDURE

The recent history of psychology hardly exhibits a more striking feature than the growth of interest in projective tests This is not due to any special discoveries in method. This writer recalls from predoctoral days, an inkblot imagination test, also a test geometrical design, believed to originate with Witmer and embodying the present idea, with the direction "Describe what you see." The whole picture-story mechanism was implicit in the Binet pictures. The growth of the projective interest is rather a phase of growing concern for psychodynamics on a much broader front It is not unlikely that if Rorschach had done his work 40 years earlier it would have been forgotten like Mendel's, cf L A. Schwartz and the picture-story technique (3), and without much wider and deeper dynamic interests, Murray might well not have turned aside to initiate the Thematic Apperception procedure

It has always been true, and bids fair to continue so, that the usefulness of these methods depends upon the judgment and insight of the user, more than upon any intrinsic features This fact places a high premium upon experience with a given method, essentially in the setting of the case history. The clinical examiner, who is accountable for the history anyway, should demand of his test procedures that they add to his clinically useful information in some proportion to the time and effort they consume Only as this criterion is met, is it justifiable further to complicate the existing projective test situation with an additional procedure. The routine use of projective techniques which develop under research conditions will err in wasting clinical time rather than over-economizing it The test need of even the moderately busy clinician is for individually efficient procedures, covering an extended range of functions, their choice and interpretation being matters for his own judgment In such a setting, the present clinically developed procedure appears to have an occasional place.

This device grew out of an interest in observing the ability to use English for conveying a precise, intended meaning—which can be very different from

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conveying something to which the reader easily attaches his own meaning The principle involved was illustrated in (4) where the task was to describe the paths followed in certain performances of the old Terman Ball-and-Field test. The next step was to set up a series of stylized geometrical figures, with the instruction to describe each one so that it could be redrawn by another person who had not seen it The individual differences among persons of similar educational level are marked, cumbrous to evaluate, and probably reflect qualitative rather than quantitative differences of intellect. In the course of these observations, symbolic responses were occasionally observed, in which the procedure assumed definite projective properties The procedure was then modified to allow more scope for these, while keeping the expressed task, at least permissively, at a descriptive level. The instructions were·

> You will be shown a series of cards, on each of which a design is shown Tell in writing what each design is, as you look at it Number your responses to correspond with the numbers shown in the lower right corner of the mount

It has not been found necessary to limit this procedure as to time, though occasionally the time available has been used up before the series has been completed. In response to any questioning as to the meaning of the instructions, the examinee has been simply assured that their interpretation is at his own discretion

Allied to the present procedure is the much more elaborate one reported by Heider and Simmel (2). This is a movie in which a large triangle, a small triangle, and a disk move with varying directions and speeds in relation to a diagrammed "house." The first instruction used, write down what happened, is close to the present instruction, but in practically all their cases "description" is not encountered, and the responses are of the present "animate process" type, taking on the character of picture-story responses. The qualitative potentialities appear marked, and to offer occasional advantages over picture-story Some of these might be preserved by arranging a series of critical stills, as in the "comic" strip, which would make the idea clinically available Some of the present cases, e.g., XC, XCII, did just this with the Circles, although these configurations were always shown one by one

The designs were originally drawn on 3 x 5 cards, but were attached to larger mounts. They embody two basic elements: a larger circle approximating 30 mm. inside diameter, and a smaller circle of 10 mm. inside diameter. The thickness of the line in which they are drawn, approximates 1 mm. Not more than two circles, always including one of the larger, appear on each card, in varying relative positions. Some of the circles are drawn in red or green instead of black. Certain irregular spreadings of the ink are occasionally picked up in the responses. If 3 × 5 cards are used, the best plan is to centre them on a standard 8½ by 11 mount, and enclose this in a transparent plastic cover. This preserves such material indefinitely without wear or soiling. ("Krylon" plastic spray is also well spoken of for such uses.)

For clinical practise, a projective test that had to be scored in order to be interpreted, would seldom be worth its salt. The functions of scoring in this setting are (*a*) to clarify one's thinking about the procedure in the process of studying it, (*b*) to provide bases for comparisons in research. The scoring process that seemed most appropriate to the present test, is practically limited to seven response classes. These seven classes seem verbally best designated by cue-words giving some idea of what they denote, i.e., *naming, descriptive, descriptive detail, object; object-action, abstraction, animate-process.* The simple human or animal response (Rorschach H, A) has been so rare as not to call for a separate class. The same applies, at least for the intellectual levels here concerned, to mere designation of geometrical form, e.g., two circles. They have however been rated "0." Parts of organisms rate as "objects." More precisely, the classes have been defined as follows:

1. (Naming) The figure(s) plus one attribute, e.g., Figure 10: Two concentric circles.

2. (Descriptive) The figure(s), plus at least two attributes (such as size, color, position), e.g., Figure 7. Two red circles, one inside the other (non-concentric).

3 (Descriptive detail) A description sufficient to enable another person to reproduce in essentials the original design, e.g., Figure 7: Two red ink circles, centre of large lies on smaller circle. Diameters about 1¼" and 7/16", so that the smaller lies within the larger, and is about 3/16" from it at its nearest point. Same line thickness, ca. 1/32".

4 (Object) Naming an object denoted by the figure, e.g., Figure 1: (*a*) outlines of fifty-cent pieces, (*b*) a cylinder.

5 (Object-action) Action or interaction of such objects; e.g., Figure 2: Machinery, big wheel turns little one.

6 (Abstraction) Including affect, e.g., Figure 1. (*a*) well balanced integration of two related fields, (*b*) down hill slant is annoying.

7 (Animate-process) Somatic or mental, e.g., Figure 3. Escape from a baneful domination.

In the case accounts to follow, the response pattern concerns the total number of responses in each class as above. To illustrate the range of responses

TABLE 1

Response class	
	Figure 1
1. Naming	Two circles which overlap each other
4. Object	Links of a chain
5. Object-action	Two planets crossing
6. Abstraction	Mathematical precision
7. Animate-process	Impingement of two lives
	Figure 2
3. Descriptive detail	A black and a red circle of equal size, separated from centre to centre by a distance of 5 radii.
5. Object-action	Definitely an eye-ball . . . appears to be straining
6. Abstraction (or 7?)	Domination of force by intuition rather than reason.
7. Animate-process	Father-son
	Figure 3
2.	*Two circles, one small, one large Through the centre of the small circle runs* the outer rim of the large circle
3.	A circle of about 1½ inches diameter, with another circle of about ½ inch *diameter, so placed that the rim of the larger passes through the centre of* the smaller
6.	(*a*) Looks insipid and characterless, annoying (*b*) Area of exploration and challenge.
7.	Something hesitantly coming out of its environment and stopping at the cold outside.
	Figure 4
1.	One red circle
4.	Round hat
6.	(*a*) *Bloody and ominous.* (*b*) *Fertility symbol, smudge represents corruption of* the flesh
7.	A past, garish life, trying to be careful not to leave its indiscretions to be noticed, but occasionally a few smudge and leave traces on an otherwise carefully hidden path
	Figure 5
3.	Two circles about 1½ inches diameter, separated by a distance about equal to the diameter of either They are side by side, the one on the left is black, the one on the right, red.
4.	Bases of whiskey-shot glasses
5.	Horses pulling a cart
7.	Life paling in the face of black circle (death).
	Figure 6
2.	Two tangent equal green circles.
3.	Two equal tangent green circles, diameter and line thickness as before
4.	Goggle eyes.
5.	Soft breeze
6.	Pleasant, cool.
7.	Two young children kissing

TABLE 1 (*Continued*)

Figure 7

3 A red circle of about 1½ inches diameter, with another circle of 1/3 that diameter inside it but not touching it However, the rim of the smaller goes through the centre of the larger
4 Loud speaker.
6 (*a*) Comic suggestion (*b*) Discomfort, noise.
7 This is a sort of flash-back to 2, the questioner is beginning to order his affairs "with more light and less heat" so to speak That which was intuition is somewhat refined by training in thought

Figure 8

3. On the right a green circle of the same diameter as the other large circles—on the left, at a distance of a little more than the diameter of the large circle, a small red circle, of diameter about 1/3 the other
5 The red representing the sun and the green, the earth traveling about it in a circle
6. Danger; hot and cold.
7 (*a*) Red looks determined and aggressive Green equally determined and aggressive, but less confident Would think red would penetrate green (*b*) Green monster seems in pursuit of the red one and will eventually swallow it up

Figure 9

3 Two circles, both of the same size as the previous large circles, side by side, apart a distance equal to a diameter of either The one to the left is red, the one to the right, black.
4 Portholes in a vessel.
6. Makes me very tired—oppresses me
7 The heads of two women chatting over a back-yard fence

Figure 10

3 Two concentric circles, inner black, outer red, and having three times the radius of the inner.
4. Bullseye.
6 Discomfort
7 (*a*) Being yelled at, being ordered, discomfort, cringing, running (*b*) Feeling that the black is trying to burst through the red or the red is trying to suppress the black

elicited by each of the figures there appear further examples of the above classes, listed under the several figures to which they were recorded (Table 1) As is well known to those who work with such material, it may be necessary to select which among alternative features of a response, is to govern scoring Here, a response is placed in the "highest" of the above classes into which it fits. Multiple response to a single figure is not uncommon

Threshold for the interpretive, symbolic responses (classes 4, 5, 6, 7) is higher for these geometrical figures than for inkblot or picture-story stimuli, and their presence implies a special degree of "Sensitive Affect" (8). Usually a response pattern of this sort is limited to persons who respond richly to the Rorschach figures; though it has been observed where Rorschach response was impoverished.

2. Case Material

Reference has already been made (6) to the use of this procedure with cases XXXI, XXXV, XXXIX, XLII, XLIII, LIII. These are briefly reviewed with more special reference to it

Case XXXI appears to have been seen at a period of relative disorganization, with evidences of better adjustment both previously and subsequently. His Circles performance was described as markedly concise and objective (6, p. 9). From the scoring standpoint it errs on the side of conciseness, the responses are limited to seven Namings, three Descriptives Rorschach response had a considerable disproportion of W's A common factor in the two response types is avoidance of analysis; Rorschach D corresponding to further descriptive response in the Circles. Neither procedure picked up the creative flair attested in the history.

Case XXXV was noted for prodigious multiple choice accomplishments, projectively undistinguished. In contrast to XXXI, Rorschach W and D are fairly balanced, in conformity with which the Circle responses yield four of Class 2, four of Class 3 (to eight figures only). This is however far below the geometrically descriptive capacity of someone with an MAT over three sigma above local average A stronger "detail" response pattern is evoked in this man by the circles than by the inkblots, though the latter have far more details to respond to. Again, neither response pattern was effective in picking up the adjustment difficulties, which as in (6) have been much more serious than those of XXXI.

Case XXXIX appears to have been seen in a reactive anxiety state, of brief duration The level of psychometric response was generally very high, the Rorschach pattern of notable richness. It is heavily detailed, as is usually the case with large response numbers; and gives a very fair reflection of the immediate personality setup, as incidentally, did the somatotyping The detail psychology is also picked up by the Circles, the initial response being the only Naming, the next three Descriptive, the remaining six, Descriptive Detail One would expect such a pattern to be associated with good Rorschach form level, as is the case. Indeed, this more highly stylized type of stimulus may well tap both the W/D and F functions more directly than do the minimally stylized figures of the Rorschach type. On the other hand the Circles fail to pick up the dynamic factors in this case, which the Rorschach response did well.

Case XLII is of interest from this standpoint. His Circle responses show a pattern between those of XXXI and XXXIX, one Naming, four Descriptive, three Descriptive Detail (eight figures only). This is out of key with the Rorschach pattern, which had rather low Form level, and about an average W/D ratio. As noted, there was evidence for a wide range of talent, including technological, which latter the Circle response picks up rather better than does the inkblot (cf. a low form level in the technological Case XIX, 5) Again from a dynamic standpoint, however, one could hardly extract from the precise and factual response to the Circles, reflections of the adjustment problem that do appear in both inkblot and picture-story response.

Case LIII presented a similar referral situation, and similarly high psychometric setup. Rorschach form level is again rather low, but there is overemphasis on W A "lack of purpose and values" in the history might fit the W and F patterning, also the developed Landscape-Cloud-Map complex, though it is less easy to reconcile with the heavy development of Color response. Circle response embodies a much greater tendency to precision thinking, five Descriptive Details, four Descriptives, one Naming. The lack of interpretive response is easier to reconcile with the history than in Case XLII since, in proportion to the general Rorschach richness, there seems to be little "Sensitive Affect."

Case XLIII presents in this context a critical contrast to the five preceding cases, in that descriptive response is practically absent, with a multiplicity of responses in the interpretive classes. There are six Object responses, three Object Actions, eight Abstraction-Affects, four Animate Processes. Is it possible to draw any relevant distinctions between this case and the preceding five?

This case most closely approaches XXXV in superlative alpha test record, but while XXXV's main strength was quantitative, this man's is verbal. And whereas XXXV's projective response was never more than mediocre, this man's Rorschach response was described as "probably the richest in this series" (6, p. 21). As elsewhere noted, there was considerable excess of Movement over Color, with development of Originality and Organization The present pattern of high level, verbalized multiple choice response, plus a comparatively rich Rorschach development, is approached among the foregoing cases by LIII, but his responses were limited to the descriptive classes Nos. 1-3. While XLIII's Rorschach response is overall somewhat richer the difference is not marked, but in LIII, C far outweighs M. It is thus as though LIII's "Sensitive Affect," while adequate to inkblot symbolism, did not meet the greater demands of a simple geometrical form. A greater perceptiveness in XLIII did meet these conditions. No doubt there is a perceptive gradient of this sort, but Case XC below, is evidence that qualitative distinctions are also involved.

In addition to the human and mechanical "Movement," and the Abstractions that appear to nearly all the Circle figures, there is in this case carry-over of themata from one figure to another, apparently more frequent under these conditions of presentation generally, than with the Rorschach. On the whole the content for Case XLIII is not regressive It was recorded that this individual made initial impressions (of instability) less favorable than justified by further contacts, and that the higher perceptivity seems to have been sufficiently balanced for very adequate subsequent general adjustments.

As illustrated in the foregoing accounts, the things to watch for in the present procedure seem to be (*a*) development of Descriptive Detail responses as opposed to the Naming and Descriptive (Form level, precisionism grading into compulsiveness, and (*b*) development of the interpretive response classes Nos. 4-7; perceptiveness, excess and/or qualitative anomalies thereof). The first of these functions (form level) it has a prospect of performing with relative economy; in the second (perceptiveness) it should discriminate more economically at upper limits, but only at upper limits. These latter (Classes 6, 7) responses exemplified earlier in these remarks, occasionally demonstrate broad or even specific dynamic trends, and may either suggest more elaborate and *ad hoc* procedure, or enable one to dispense with it

More detail is now offered for cases not previously cited, in which this procedure appeared to make a distinctive addition to the overall pattern of test response. Verbatim citations of response are impracticable for reasons of discretion; one is limited to the distribution of responses in Classes 1-7, and general qualitative comment. As previously, the material recites (*a*) the problem of referral; (*b*) anamnestic data, (*c*) present psychometric data; (*d*) the Circles response in relation thereto, (*e*) available katamnestic data of relevance These last are meagre, owing partly to the recency of most cases concerned.

Case LXXXV. *a* Inadequate academic grades despite good official prediction. Question of aptitude for a medical career, including general personality organization

b The history describes a socio-economic status rather above average, an "introverted type," with little social aptitude, but with intellectual drives and interests beyond his age. Restless under inactivity; as such this could be a Kempfian A—, or a somatotonic trait, but the restlessness is hardly strong enough for the latter. It is rather an incapacity to support more than moderately accumulated tensions Secondary school accomplishment very superior, well distributed among subjects. In medical examination here, superior impression in respect to aesthetic and cultural motivation, and for college adjustment as such; inferior impression as to appearance and manner, social relations, basic personality soundness. Athletic ability and participation rated marginally Linearity 13.5, well above average

c. Entrance tests uniformly high, better than above predictive rank, suggesting that some less favorable factors had been spotted. SAT +2.0, MAT +1 06, with comparable rankings in specific subjects. Here, a Differential Aptitude series averages more modestly, very superior for Mechanical Reasoning, but well below average for Verbal Reasoning and even marginal for Space Relations (local norms). Instructions were picked up with no more than average facility.

From a projective standpoint, the Rorschach pattern is rather flat; response number is average, but practically no Color, Movement, or Organization, fair Originality, though only two responses would rate this category in the Rorschach sense. F% is of course very high, but its level no more than average. It seems worth noting that while he expresses himself as liking to deal with larger, as it were, philosophical issues and disliking detail, his Rorschach response showed a preponderance of D over W, nearly four times the local average. "What-would-happen-if" responses were mediocre, which would fit his W/D estimate in that the best responses require a prompt sense of various, and but indirectly related "happenings."

d. From this W/D standpoint the Circle responses tend to agree with the Rorschach testimony of preference for detail. Among 13 responses five are Class 3, four Class 2, a single Class 1 Thus in the comparatively structured projective situations (Rorschach, Circles) where he readily can "go into detail," he does so, the less structured "What-would-happen-if" is responded to in terms of larger issues, although its effective handling depends quite as much on detail. There are three rather low level "object" responses among the Circles, as such fairly consistent with the Rorschach pattern. Neither procedure picked up a social sensitivity distinctly hampering his adjustment to fellow-students

While the above test results implied capacity for a medical education, the history would be less favorable for a career in medical practise A Kuder Preference pattern yielded nothing positive in this respect, but does bear out the aversion to "detail" in terms of a minimal Clerical score, even for the local group The case offers some examples of disjunction between motivation and aptitude *e.* Continues rather unsettled in academic outlook, with various adjustment difficulties consistent with implications above.

Case LXXXVI. *a.* Difficulties in sex adjustment, general personality organization.

b Economically lower middle. A very good all-round previous record, academically and athletically. Medical examination rates him outstandingly for practical and cultural motivations, above average in the other areas rated, except somehow down to average only in "basic personality (steadiness, integration, mood level, neurotic and neurasthenic qualities)" The apparent discrepancy may be understood by the more phenotypal quality of the other areas An excellent academic prediction is not fully borne out by the event, though the work is well above average. There have been recurring cyclothymic episodes, possibly reactive to above adjustmental difficulties, and in accord with the basic personality rating cited Linearity 13.1, practically average.

c Entrance test evidence of such verbal and qualitative capacity, that multiple choice approaches were dispensed with. Development of the Rorschach pattern limited by "color shock," substantial restriction to the Form category, and these of rather inferior level. There is, relatively to present material, a nearly two-fold excess of W. Much shading, anatomy, and sex content. In spite of the high verbal aptitudes indicated, a word-association series took about twice the time usual with this intellectual class, with much qualitative disorganization. Subjective response-content, with implicit emotional charges. Picture-story responses, after good initial structuring, had rather weak solutions.

d Circle responses practically equal the Rorschach in number. There are six descriptive, but no descriptive-detail, in conformity with the rather low Rorschach form-level for such an intellect. There are six object, but no object-action responses. The most numerous response category is the affective-abstract, eight being assigned to this class. But in conformity with the general F— tendency, they are not as clear cut as the usual representatives of this class.

Behaviorally, the history suggests a mixture of cerebrotonic and somatotonic traits, which furnishes a good soil for psychogenic conflict. Disorganization at an emotional level is hinted at in disturbing effects of color, both in Rorschach and Circles, and the cyclothymic episodes rather bear this out. At the time, suggestion was made as to a "repressed viscerotonia," sacrifice of benign elements of this component to over-intellectual demands

e Subsequent improvement, clearing up of depressive episode, though not caught up yet academically.

Case LXXXVII. *a* Recent mild depression with avoidance of social contacts Largely cleared up now, but questions of intellectual and personality organization.

b. General average socio-economic background Reasonably active in secondary school, mainly along verbal lines Described as over-serious, needing more somatic activity. Entrance physical examination notes poor muscle tonus, "typical introvert of esthete type", some gastric symptoms, intolerance of noise. High ratings for practical (?) and cultural attitudes, probable college adjustment, inferior ratings for appearance and manner, athletic ability and participation Linearity 13.9, considerable. Psychiatrically, note is made of a very good academic record in the presence of low test scores A clinical picture at first showing some ominous features, soon began to clear up under apparently effective medication. A later recurrence, with similar management and course, led to present referral.

c. SAT —1 2, MAT + 24, but the main field of academic interest is verbal Here, there was normal social appearance. The test scores are much lower than ordinarily associated with his academic performance The verbal alpha, —.81, is fairly close to SAT, but the number alpha fails badly in the arithmetical reasoning function, and summates to only —72. When one has as good an academic record as here seen, with so undistinguished a psychometric status one looks for (*a*) evidence of very intensive application, or (*b*) especially rich projective work. The projective evidence is contrary, Rorschach response is constricted (R over a sigma low, only traces of Color, Movement, Originality, Organization), and the black figures show occasional disorganizing effects. Word-association did not pick this up, responses being prompt and fairly objective

d For one of his intellectual calibre, this man presents a not less striking extreme of "coarctation" in the Circle response. Eight responses are of the naming level, two descriptive, nothing higher This is difficult to understand except as a residual of the depressive episode reported A slight corroboration is derivable from the handwriting, which is notably high in what graphologists call "standard class," and would lead one to expect, under normal conditions, a much more vigorous intellectual response than occurs to these figures or to the Rorschach inkblots. One is even entitled to speculate that the flat word-association pattern expresses the same "coarctation," and is similarly episodic.

e After some improvement, relapsed into "pre-examination anxiety"; renewed difficulties with social contacts, and domestic disharmonies Nothing of long term ominous nature

Case LXXXVIII. *a.* Question of readmission after withdrawal on medical grounds, about two years previously.

b. At previous admission, considered medically to be well adjusted; "pleasant, cooperative." Linearity 13.5 Found the work rather difficult, troubled with sleeplessness, over-reaction to examination stresses. Referred at this time concerning capacity for this level of academic work, and if there seemed to be any formal disabilities. Record of a very good personal impression Performance distinguished by considerably better work in open-end, projective functions than with multiple choice responses These low multiple choice responses in turn, were a function of slow reading of any but the simplest material, despite an excellent word-knowledge This picture was best referable to anxiety, leading to a compulsive checking and rechecking of what was read. The same process led to overelaboration of response in open-end functions The handicapping effect of these symptoms on study led to withdrawal as above, and subsequent referral on seeking readmission

c. Speed alpha substantially as before, verbal + 02, number —2.2, showing marked disjunction; subtests have good internal consistency. Vocabulary substantially as before, +.8. Verbal concepts are adequately dealt with at simple levels, but some difficulty with more analytical reasoning is suggested by a Thurstone Letter-Grouping score of —1 3. Word-association items were dealt with somewhat more promptly and objectively than before. But the compulsive delays in test work previously cited, were still in evidence.

d. A relatively effective response by this man in tests of the Rorschach type, has been mentioned. In the Circles, however, each figure elicits a Descriptive Detail response, and no other. This is the more striking, as he lacks command of the geometrical terms that facilitate descriptive detail. One seldom sees so sharply focused an anxiety effect, although it was reasonably clear in other aspects of the observation.

e The general psychometric picture was such that one could not be assured of dealing with the local program in the presence of the anxieties. With the temperament involved, it was felt that a relatively more physically and humanistically oriented environment would be better suited to his real assets.

Case LXXXIX. *a.* Problems of social inhibition, and academic record below expectation

b. Economic circumstances comfortable, highly intellectual antecedents, with some associated instabilities. Childhood difficult, with various environmental insecurities, capable of accounting for much of the present feeling of social inadequacy. On medical examination made an impression superior in respect to manner and speech, as well as practical motivations and basic personality. Rated inferior only for athletic history. Linearity 13.4, not far above average.

c One seldom sees so clearly defined a psychometric pattern. Entrance SAT —87, MAT +91. Here, speed alpha verbal +03, number +1.1. Vocabulary range —1.5 Note the progression in the verbal functions; the score drops as the cultural factor increases. Rorschach R is about half a sigma plus, and all but two are D's. Neither Movement nor Color are marked, but there is more color, along with "shock" The chief strength is in Originality, bringing in the technical background. Though Form responses dominate, their level would not rate specially high. Word-association response was slow, with various apparently complex-determined responses. Kuder Preference gave an exceptional spread. from a 99th percentile rank for the Scientific area to a near zero for the Clerical.

d In the presence of this trait-configuration, the Circle responses are distinctive first for their number, 22. Nineteen of these are objects, and eight of them are object-action, though the Rorschach record gives no instance of "m" The mechanical motif dominates heavily, and ideas of "movement" become explicit even as abstractions. Indeed these Circle responses give a miniature of the test pattern as a whole. The content denotes the preoccupation with "things" and the idioms used express the high intellectual level at which they are dealt with (as when one says "pterodactyl" for Rorschach V). The low "standard class" of the handwriting testifies to the almost negativistic cultural attitudes implicit in such a vocabulary score at his socio-economic level At the time, the case was spoken of as a "type specimen to illustrate the association of technological motivations with lessened sociality," and the critical interest of the psychogenesis was pointed out. *A priori*, one might (*a*) become motivated toward things because of frustration in social achievements, such as occurred here. Or (*b*) one might fail to develop social skills because mechanical interests absorb energy needed therefor. This question was briefly taken up in (8, p. 196) where the data pointed to at least an occasional operation of (*a*) But by no means every socially frustrated juvenile becomes a good technologist (some in this series have reacted by becoming good athletes). The present material can also point to good technologists where no relationship to social frustration is traceable (Cases IX, XV).

e. Follow up data of relevance are not available for this man

Case XC. *a* Emotional overreaction to initial academic difficulties. Question of direction and level of capacities

b Middle economic status, maturer than most students beginning college. Linearity 12 2. SAT above local average, MAT over two sigma low. Moderate achievement scores balanced by strong motivation. On entrance, record of very good impression as to appearance and manner, social relations, and general prospect of college adjustment. Initial grades actually not much below what might have been expected, such as most students who receive them support well enough, and suggesting other dynamic factors. At time of referral, described as "wild-eyed, fanatical . . . tempestuous personality."

c. Vocabulary range a little over a sigma high, which, with qualitative evidence from other sources, apparently resulted in dispensing with other formal intellectual tests Word-association had many delays and unusual responses, on the whole a rather disorganized pattern. In Rorschach response, the anxieties were represented in marked over-development of the shading and vista categories, but with almost no color or movement, the former perhaps surprising in view of the above cited characterizations Form level is good, but on the whole the record is flatter than might have been looked for There was considerable D excess A repressed anxiety would be easier to reconcile with such a pattern than one where it is so overt

d This is one of the rare cases where the Circles turn up a richer response pattern than the Rorschach figures, within reasonably comparable times. There is no response of the descriptive, or of the object level; all are either abstract, or animate process. But the affective element is nearly neutral, and the "action" is nothing vigorous, mental processes for the most part, and a balancing of issues, certainly nothing reflecting active "turmoil" or "fanaticism" Such might have been inferred from the word-associations, though again hardly from the Rorschach pattern.

e The sequel so far as traceable weighs rather against so alarmist a view as could be supported by the word-association response. It suggests the not uncommon and transient anxieties elicited by the unaccustomed study requirements of "higher" education, in this case perhaps accentuated by some years of detachment from a scholastic environment A general straightening-out process seems to have taken place, with normal, while undistinguished, college prospects Assuming for the moment, however, a clinical attitude rather than the methodological one basic to this paper, questions are raised whether this individual was well advised to seek a college education for the reasons overtly given, and as to the nature and extent of responsibilities which attach to admitting authorities concerning such matters. What principles should guide admitting authorities, when the evidence is that admission would be, in the long run, against the best interests of the applicant?

Case XCI *a.* History of various instabilities including somatic symptoms of psychogenic nature. Question of sufficient personality organization for the present academic environment.

b Socio-economically upper middle. A locally average picture of athletic and social activity, but always complicated by the somatic symptoms above. General medical impression rather below average, apparently on such grounds as self-consciousness, shyness, excitability, anxiety attacks. Academic work marginal to unsatisfactory in the presence of estimated adequate intelligence; mention of over-verbalization and active fantasy life.

c Formal intellectual tests limited to the local speed alpha, verbal +.77, number —1.2, bearing out the above verbalistic impression. Other observations centered upon projective work. Rorschach response number about average, but unusually rich in content. W:D is average, M:C about as 2:1, considerable shading and texture; H exceeds A. Word-association response highly subjective and unusual, with long reaction times (those in Rorschach were fairly short) and much accessory verbiage. Picture-story themes are a mixture of persecution, exploitation (including sex), and cynicism. Like the preceding functions, they denote a higher grade of intellectual activity than is implicit in the multiple choice test or academic work.

d Circle responses include none in the naming or descriptive classes. Of the total, 15 are object, 16 are abstraction-affect; seven are animate process. This is a response total higher than made to the Rorschach figures though the time utilized may have been greater (for the examinee, Circle responses being written, self-administered). The content is more clearly regressive ("intropunitive") than in the picture-stories though the earlier responses are Object, and thematic tendencies do not develop till the latter half. It is a more internally consistent picture than given by the other procedures, though not consequently the more valid.

The atypicality of the projective work need not blind one to the high intellectual capacity implicit therein, or to the fairly wide latitude of adjustment pattern that the local environment is prepared to meet. But neither should it blind one to the fact that if this man were to break down, the recorded projective patterns would certainly be pointed to as prodromata of serious implication.

e Subsequent graduation with credit, but episodes of considerable disorganization, very active fancy life, with full insight. Long term view still problematical.

Case XCII. *a* Question of readmission after previous separation with unsatisfactory academic record.

b Previous entrance medical examination records comfortable socio-economic circumstances and (probably vague) plans for a professional career. Interests essentially ideational, none in sports, girls. Negative attitude to physical exercise. Formal ratings in terms of "weak; uncertain; tense; effeminate; dreamy"; with "fluent and formulated" speech. A fair average academic performance had been forecast, which the event did not sustain, unsatisfactory grades in areas of presumable strength (verbal). Psychiatric note of parental overprotection.

Seen psychometrically at this earlier time, the main relevance was attached to projective tests. No evidence for intellectual impairment. The general response content was highly thematic and emotionally charged. Sado-masochistic motifs abound; the Rorschach figures elicit practically no response of concrete content, practically all abstractions variously presenting the above dominant theme. Picture-story responses carried more of a cynical, misanthropic note. An inventory approach was less atypical; Scales 1 and 2 of the Cornell Selectee Index would barely have picked up this man for neuropsychiatric appraisal.

Linearity was 14.1, marked. Somatotype rated 3-2-6, marked ectomorphy, with much disproportion, supporting an estimate of "weak basic personality." As noted, the academic record was unsatisfactory, and separation followed on these grounds. After some months, in which there was evidence of improved attitudes, there arose the question of his returning, with referral for further observations.

c. Certain formal tests were included at this time. Verbal speed alpha scores +1.1, number —.4, in substantial accord with earlier SAT/MAT scores Vocabulary runs somewhat higher, +1.4. No doubt of intellectual equipment to carry on work of the local level. The Rorschach work had somewhat more concrete tendency than the previous, but was still very atypical, much sado-masochistic motivation, in which the identification appears mainly with the latter. Movement, Abstraction, Originality, and Organization are highly developed. Similarly, a word-association series elicited a markedly subjective response pattern, with long response times, in voice so low as to require much repetition.

d. These tendencies are picked up by the Circles as effectively, and rather more efficiently Of the 13 responses recorded, one is Abstraction, four are Abstract-Affective, eight animate process Themata to the various successive designs are (1) object movement (Rorschach) under restraint, (2) "smother-love"; (3) frustration leading to passivity; (4) worldliness; (5) contrast of joy and tragedy; (6) mutual attraction in naive figures; (7) torturous confinement; (8) parent-antagonism; (9) conflict of good and evil, (10) partial overcoming of evil by good.

Thus the markedly cerebrotonic temperament denoted by the history is supplemented by an extreme of "Sensitive Affect," in which stimuli of little intrinsic meaning, take on metaphors that must at least approach the unique. One of the necessary factors in creative talent is clearly present, and a reasonable hope of achieving others was perhaps the best justification for readmission as asked. The local situation was probably as favorable as any from this standpoint, the typical "small college" is a greater risk for such nonconformists.

e His real talents enabled him excellently to present his case, and readmission followed. Although general integration appeared better, the academic sequel was not sufficiently so and a second separation followed.

A majority of the foregoing cases were given the Circles test because of reason to expect a response that would be clinically significant. They are thus inappropriate to estimating frequencies of given response patterns in the local population at large. There are available some 40 records where the test was given as it were routinely, without regard to special intrinsic relevance. Eighteen of these are Hygiene Department referrals. Twenty-two are participants in a special project, graduate students in the Episcopal Theological School at Cambridge, Massachusetts. A rough idea of how the patterns distributed among these cases, is represented in Table 2.

TABLE 2

Response class	0	1	2	3	4	5	6	7
Total responses in the several classes (N = 40)	22	100	131	51	105	34	36	29
Extreme case, "constriction"	14	0	0	0	1	0	0	0
Extreme case, "dilation"	0	0	0	0	6	5	9	3
Frequency of modal response class	1	8	11	6	10	0	3	1

In a given case, the responses tend to group themselves at either the descriptive (1-3) or symbolic (4-7) levels. Of the above 40 cases, 18 gave no response above the descriptive level. An occasional case gives no response at the descriptive level and gives only objects and/or abstractions, animate-process. One case, as shown above, gave but one response at any credited level; in another all responses were Descriptive (Class 2); in two others, all were Descriptive Detail (Class 3).

Three of the above cases are considered for special features which they present. Their chief bearing is again on the concept represented by Rorschach F. What psychometric and other configurations for example, were associated with the extreme constriction, "coarctation," represented by 14 responses of zero level out of a total of 15?

Case XCIII. *a.* Academic work not up to reasonable expectation, feeling of "logeyness," but little affective depression.

b. Many features of unusual promise A benign somatotonic setup; much athletic interest and accomplishment, but with some involvement of head injuries. Entrance record recites "alive, attractive personality, will contribute a great deal"; from another source, "healthy young animal; good approach to life's problems, should do well." Given superior ratings in basic personality, social relations, war adjustment, etc, down to average in aesthetic and cultural areas only. This picture is modified by some evidences for narcolepsy, which seems to have been little weighted. Psychiatric history speaks of heavy sleep and mild narcolepsy, possibly associated with the head injuries above mentioned. Linearity 13.4.

c. Entrance verbal aptitude ratings not available, but other evidence for at least a sigma above local average. Quantitative accomplishment perhaps as much below (no such disparity in secondary school grades). Here, verbal speed alpha —1.2 (analogies only — 63); number —1.06 (series completion only — 19). Note that in each, the higher grade subtests stand up best, the easier functions, most weighting speed, are the most penalized. Vocabulary range, which is not timed, rates actually + 35, much nearer expectation. Similarly, subtests of the Differential Aptitude series (1) rated fairly high in Analogies and Abstract Reasoning, lower in the Number, Mechanical, and Spatial subtests.

Rorschach response number about average, but W.D was nearly 1:4 instead of the 1:1 6 local average for the procedure used. It is moderately constricted; only the M category is at all developed. There is a great excess of P responses, which some might look on as reflecting the above superior sociality, but more probably reflects a constriction which favors commonplaces in becoming overt. The excess of M over C might support such a view.

d. The comparative academic failure, and the reduced test performances here, seem to be parts of the narcoleptic picture. This narrowing of the mental horizon was best picked up in the Circles responses, nearly all of which are simple shapes, given in the briefest phraseology recalled

The level of mental functioning shown would hardly be an earnest of satisfactory local work, to say nothing of the honor status that could well have been predicted at entrance.

e. Some improvement under benzedrine is reported.

Case XCIV *a.* Question of readmission after previous unsatisfactory record, seemingly associated with cyclothymic symptoms

b. Apparently a good military record, many months overseas, commissioned rank on separation. On medical scrutiny here, however, described in such terms as unstable, immature, insecure, no genuine interest in this type of education. "Will have trouble in college, doubt if he makes it"

c Entrance test data unavailable. Here, speed alpha verbal —1 0, number —1.4. Vocabulary range —.95. A CTS reading comprehension test scored about lower quartile for the local population. General behavior in the test situation was overactive, and distractibility was suspected of modifying the performance, especially with the Rorschach figures. The colors in VIII and IX seemed to have a specially disorganizing effect.

d. The distinctive feature of the Circle responses is a low Form level, that is to say, failure to document any but relatively elementary features of the designs. It generally attains the second, Descriptive level, but nowhere rises above this. Misspellings and clumsy phraseology contribute to the "F minus" picture, in ways that would be lost in oral response. This may be a reason why the Rorschach record makes a somewhat more favorable impression With his flightiness, one might get symbolic responses to the Circles, if his basic verbal capacity were of higher level (alpha, vocabulary). Symbolic responses are readily accomplished in the less stylized Rorschach figures. With the Circles the limited creative intelligence holds him to description, and combined with the flightiness, keeps the descriptions at a comparatively low level Deficiencies of "Form perception" are thus thrown into more precise relief.

e With this and other features in the picture, it was the psychiatric opinion that he ought not to attempt the local program, and that in whatever he did do, there should be more emphasis on physical activity, which suggestions were not unacceptable They seem to have been largely carried out, with a quieting down of the over-activity above mentioned, perhaps understated.

Case XCV. *a* Referred as "restless, moody, uncertain." Some (superficial) interest in artistic career Question of any aptitude indications

b On entrance, described as "attractive, well-balanced, at ease" Superior ratings for cultural motivations, basic personality, and prospect of college adjustment, athletic participation relatively minor Linearity 13 6. Subsequent grades a little below indicated capacities but improving; no cause for academic concern

c. Entrance SAT +1.2, MAT +.69, no particular weaknesses of academic achievement. Present observations accord; chief strengths in the verbal area, DAT (1) Verbal Reasoning +2 2, though mechanical and spatial functions also do well, number functions test only local average.

Projective data largely limited to picture-stories which as such are well developed, but noteworthy in giving no evidence of a strong parent-antagonism to which direct verbal expression is freely given. The accounts do reflect a somewhat regressive state of mind under which they are produced. This is claimed to have existed since coming to college, but is far out of accord with the medical estimate on entrance, and with recorded self-estimate at that time There was mentioned a Kuder profile accomplished at that time, which was "indecisive." On scrutiny, it appears especially distinctive. Extremely low scores appear for the Mechanical, Scientific, and Social Service areas, and very high ones in the remainder, a profile of strong likes and dislikes, anything but the *nil admirari* attitude of present observation.

d. Rorschach data are regrettably unavailable for comparison, but the dominant Circle response type is descriptive, scarcely rising at all above it Despite the superior language aptitudes above recorded, the expressions are at times not merely vague but positively faulty, the figures being "poorly perceived" in the most special Rorschach sense. It seems no matter for surprise that when someone with the above intellectual endowment perceives (and apperceives) such simple figures with no more accuracy than here, he should also find himself temporarily puzzled in dealing with larger issues.

Comment is recorded concerning the relation of body-build to the personality type suggested; too much mesomorphy for the present aesthetic and cultural interests. It is uncertain how deep these concerns really are, or how motivated, but they are clearly in conflict with much of the Sheldonian psychic correlate for this body-build, with understandable consequences such as seen here.

e. Follow-up data of relevance are not available for this man.

Among the theological students above mentioned there were 13 whose Circle responses were essentially Descriptive, Classes 0-3, with a single Symbolic at Class 4. This group includes no case regarded by collective Staff estimate as of first-rate professional promise. It includes the four cases regarded as of least professional promise. There was among these four, no instance of class 3 Description; they did include the isolated Class 4 response In the four cases of highest rating on the other hand, there were but three responses of any Descriptive level, the others, 58 in all, being Symbolic.

A corresponding Rorschach function is represented by a grade assigned for general richness or "dilation." The same trend appears, with a suggestion of more overlap. On an ABCDE scale for "dilation," the low group showed grades of C, D, D+, D— Grades for the high group were A, B, C, C—.

Color and Originality seemed to contribute most to this trend. Two brief multiple choice tests for verbal and quantitative functions (DAT 1, as above, ratings on quarter-sigma basis as in 7), showed for the low group one B—, two C—, one D, two D—, two E—. The high group showed some overlap, with one A, one B+, two B—, one each of C, C—, D+, D. There was no suggestion that verbal or quantitative function had the more differentiating features.

C. Discussion

In its field, the Rorschach test occupies today a place comparable to that of the Binet tests 30 years ago. The great service of the Binet procedures was to present the intellectual function in a form at once quantifiable and with a social, more especially educational, significance Once this was established however, the more analytically-minded users soon perceived it as an over-generalized procedure, with functions needing to be broken down before it was suited to most types of clinical work There were attempts to do this, but the Binet structure is resistant to it, and little came of them. The work of Porteus, and of Pintner and Paterson broke trail in this direction Today one sees the functions in question largely taken over by procedures more analytically constructed, as the Gesell techniques for early levels of development, and more especially the Wechsler-Bellevue for later ones.

Unlike the Binet procedure with its *IQ*, the Rorschach test never staked much of its significance on a global concept, such as the "coarctation" and "dilation" of present reference. On the contrary, one of its chief attractions for the clinician lay in stressing from the beginning, a breakdown of personality functions, which had much intrinsic merit. But like the Binet it is overgeneralized as a procedure, representing an early stage in the development of its field. However admirably it has performed in pointing up the concepts denoted by W/D, M, F, the Color series, etc., one may properly look to more specialized procedures which will severally represent these things with at least equal rationality, and at less cost in time and effort.

Responses to the present figures classify into the broad categories of Descriptive and Symbolic The directions were set up so as to leave the examinee as free as possible to respond in either kind. Normally there is clear dominance of one kind or the other The tendency towards, and/or capacity for, Descriptive response has been offered as bringing into sharper focus the type of distinction represented by the Rorschach F categories For this purpose however, directions should possibly be oriented more towards Descriptive response, so as to elicit symbolic response only in those hardly capable of the other, as might be for example in Case XCII above. Such directions might well be framed along the lines of those on p 188 (4). If one's main concern is with symbolic responses, the task of framing directions is more difficult, and will be largely to "test the (lower) limits" for symbolic response. Here it may be advisable, even necessary to give illustrations, something generally avoided in projective tests.

The figures used in the foregoing study were rather casually arrived at, and nothing is further from intention than to set them up in any rôle of a procedural standard. Hence they have not even been reproduced here One need consider only what particular sorts of simple stylized figures are best suited to elicit, and demonstrate individual differences in, the types of response which have been exhibited. Circles are the simplest to draw; but there is little doubt that the procedure would be enhanced in effectiveness by the inclusion of ellipses, triangles, and rectangles, in various forms and orientations There should probably not be configurations of more than two. From the standpoint of descriptive responses, color can perhaps be dispensed with; for symbolic ones, it appears to be worth keeping. A written, self-administering procedure is definitely to be preferred

Validation of projective tests presents extraordinary difficulty, partly because criteria are elusive. Many personality traits with which the Rorschach test for example, is concerned, are resistant to both definition and measurement. There is even a question how far they exist as general traits Moreover, the ancient truth that meaning depends upon context applies with special force to the factors into which such a test is broken down Traditionally, anatomical responses were supposed to be a Rorschach liability, but one had to make special allowances for medical students. One of this writer's early Rorschach impressions concerned the relation of White Space responses to season of the year

No simple statement (the fate of complex ones appears dubious at this writing) of the relation of W or M response to "intelligence" will long survive among cases where multiple choice tests of the function are made. Nor for that matter, will a multiple choice criterion of intelligence maintain itself in good vigor, where projective tests are also made. Not without having studied both aspects, is one in much of a position to evaluate this function. Indeed, the whole concept of "tests" validity has an application limited essentially to mass evaluation for specific abilities. Tests of clerical aptitude are comparatively valid, but whether a given person will make a good "clerk," depends greatly upon other variables of which motivation is probably the chief.

Hence, no single test should be accorded much clinical validity as such Nor is it a test's function to be clinically valid of itself, but rather to add to the understanding of the total information about the case. By itself, either Rorschach or Circle response could have rated Case XLIII as an unstable, even psychopathic personality; in the total setting it denotes a rich and well organized one. XCII's could have denoted a person of marked, if rather *macabre* creative achievement, instead of the temporary disorganization that was the case.

It is thus unsound for a clinician to study mental tests, particularly projective ones, in even a partial vacuum. Questions like "What does M/C, or excess Descriptive Detail mean?" can have only a very fragmentary and often misleading answer The question of what it means in this case, has an answer, but only those who have seen these functions in the setting of the total picture, will ever well understand it.

In the history of group "intelligence" testing it was soon clear that the tests performed better as to false positives than as to pickup. Somewhat the same thing is true of the projective techniques. A disorganized word-association pattern is much better evidence for personality imbalance than is a bland response type for good integrations. Well developed Rorschach M and O is better evidence for well developed imaginative life, than their absence for the lack of it One should say the same for a pattern of Abstractions and Animate Process in response to the Circles The nature of the stimulus is by no means without influence on the development of projective response. For the local population, the threshold has seemed to be generally lower for Picture-Story than for Rorschach, and for Rorschach than for Circles The "best all round" is perhaps Rorschach, but not necessarily the best, or sufficient for the purpose, in a given case

To sum up, a series of stylized geometrical figures, circles of different sizes and colors, was given in a projective setting to a series of cases, about 45 of whom enter variously into the present report. Under the instructional conditions, responses separate first into Descriptive and Symbolic classes Four sorts of Descriptive, and four sorts of Symbolic responses are distinguished for evaluative purposes. It is suggested that the development of Descriptive response to this class of stimuli is capable of giving a sharper definition to the F categories of Rorschach. Symbolic responses represent more especially the degree to which one's apperceptions are limited to the objective form The presentation is based essentially on 11 case accounts, illustrating the procedure in these functions. Effort is made to place it in the perspective of now current tests, with suggestions for further development of the idea.

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HOARDING BEHAVIOR IN THE GOLDEN HAMSTER (MESOCRICETUS AURATUS AURATUS)*

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A. INTRODUCTION

A survey of the literature reveals that little has been published in the United States on the behavior of the Syrian or golden hamster which was introduced in this country in 1938. Little material has been found that describes the natural habitat or habits of this animal. Waterhouse (12) published the first known article describing the golden hamster, and there has been a rather miscellaneous assortment of papers on material of an ecological nature in regard to the hamster in the laboratory environment (e.g., 2, 4, 7).

As this animal is noted for its ability to hoard quantities of food in its natural habitat, the writers believed that it would be of some interest to conduct an exploratory study of hoarding under laboratory conditions in the hope that this animal might prove to be a useful subject for studying this phenomenon. Some narrative information (6, 8) is available on hoarding habits of the Syrian hamster and of the European hamster, but no quantitative data has been found.

B. METHOD AND PROCEDURE

1. *Subjects*

Eight golden hamsters, four males and four females, from the Bucknell colony were used as subjects. The animals were approximately four months of age at the start of the experiment and were from three litters. The subjects were virgin and had never been used in any previous experiment. This particular strain of animals had been traced to an original family of hamsters discovered in 1930 at Allepo, Syria.

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[1] The writers would like to express their thanks to Leonard Block and Naomi Block for their assistance in carrying out this experiment They would also like to express their thanks to Dr. Hulda Magalhaes for the opportunity to examine her unpublished bibliography on hamsters, and for the use of animals from her colony

2 *Living Conditions*

The experiment was performed in a laboratory room where the hamsters were housed. The animals lived in individual cages, wood frame, wire mesh enclosure, 17 × 11 × 11 inches. Wire mesh alleys, five inches square, were permanently attached to the front of each cage. An adequate water supply was maintained at all times The subjects had been fed an unlimited diet of laboratory checkers (Purina) supplemented with daily rations of lettuce from the time of weaning.

Nesting material in the form of shredded newspaper was provided regularly. Feces and urine dropped through the mesh bottom, and it may be assumed that the animals did not eat their feces. Some paper was consumed by the subjects during deprivation. Temperature ranged from 27 to 29 degrees C.

3. *Experimental Procedure*

The subjects were placed on a deprivation diet of one food pellet, approximately five grams, per day. This diet was maintained for seven consecutive days and will be called the deprivation period. The diet during the second seven days of the experimental period, the satiation period, consisted of three food pellets per day.

Each evening at 8·30, the alleys were filled with food pellets and the subjects were permitted to hoard for 30 minutes. At the end of this period, all pellets remaining in the alley were removed, and the hoard was removed from the cage and counted. Each animal was weighed daily after the hoarding period, given fresh water and one or three pellets depending on the experimental condition.

The animals were carefully observed during the hoarding period and any behavior which seemed of significance was recorded.

C. RESULTS AND DISCUSSION

The average number of pellets hoarded daily during the 14-day period by the group is presented in Figure 1. The onset of hoarding following 24 hours deprivation is rapid. As can be seen in Figure 1, the greatest frequency occurred on Days 1 and 2. These two days are followed by a gradual decrease until Day 7. This trend during deprivation is in sharp contrast to the behavior of the rat, in which the onset of hoarding does not ordinarily occur until the third or fourth day of deprivation and does not reach a peak level until much later (9, 10, 11)

The average number of pellets hoarded daily by the group during the

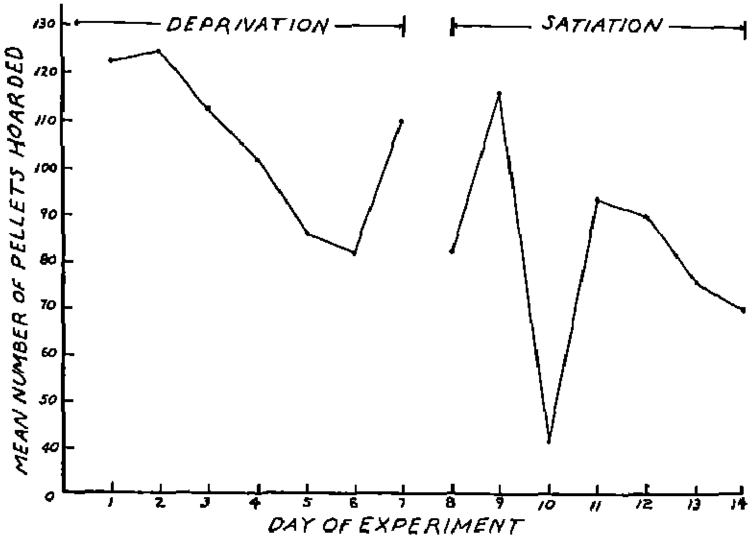

FIGURE 1
The Mean Number of Pellets Hoarded by the Group for Each Day of the Experimental Period

deprivation period was 843.1 and during satiation, the corresponding number was 649.7. The difference is significant at the .01 level ($t = 2.9$). Thus, satiation feeding led to a 22.9 per cent decrease in hoarding. Again referring to Figure 1, it can be seen that the general trend during satiation was downward. The day-by-day fluctuations were the result of intermittent hoarding on the part of the males, who were much poorer hoarders than the females. It was not possible to continue satiation hoarding for the group beyond the seven-day period because of changes in the condition of the laboratory. It is probable, however, that hoarding would not have become extinct as preliminary observations of other hamsters in the Bucknell colony revealed that some hoarding takes place when no known deprivation has occurred. McLellan (6) has reported that the female golden hamster will hoard a variety of materials such as cotton tufts, paper and rick-rack braid, as well as food under what seem to be adequate feeding conditions. As is true for the rat, deprivation feeding seems to raise the level of hoarding. There is no apparent evidence that hoarding in the hamster is necessarily related to learning. Furthermore, as the alleys were only five inches long and permanently secured to the cages 48 hours prior to the beginning of the hoarding trials, it is not probable that insecurity or shyness (1) is an operating factor.

Kayser (3), studying the mechanism of sleep in hibernation, reports that the first behavioral signs of hibernation are food hoarding and nest building. This behavior can be induced by lowering the temperature of the environment below 13° C. As the temperature in this study remained at approximately 28° C., it would not seem to be the instigator of the behavior. Kayser further proposes as an internal factor, a polyglandular deficit resulting from an involution of the anterior hypophysis. Hypophysectomized hamsters exhibited food hoarding and nest building but no sleep when placed in an environmental temperature of 8° C. McCleary and Morgan (5) have reported on the effects of temperature on hoarding in the rat. Deprivation (nutritional, water, warmth) appears to be the common instigating factor for hoarding The question of what physiological mechanism is aroused by this deprivation remains as yet unanswered.

The major purpose of the present study was to explore the possible value of the hamster as a subject for hoarding under laboratory conditions. Some data gathered during the hoarding trials is pertinent to this purpose The chief disadvantage of the hamster as a subject in this study was the amount of time the experimenters had to spend after each trial, removing the pellets manually from the pouches. The females, who hoarded more, also pouched more frequently and this necessitated manual depouching during deprivation trials. As the females became extremely ill-tempered during deprivation, depouching constituted somewhat of a problem. This problem of removing pellets from the pouches could be overcome by using only large pellets (6 grams) or by use of some device like wet mash in bottle caps which could not be pouched.

While hoarding, the hamster works methodically and rhythmically usually stopping only to drink, wash, and occasionally to eat. In contrast, the rat literally runs when hoarding particularly during the first five or ten minutes, then tends to eat frequently and use the remainder of the period for exploration and exercise. Each of the hamsters, when hoarding, usually piled the pellets in or near the nest. On several occasions, a pouched female hamster would burrow under her nest and come out depouched. The pellets were ordinarily piled neatly, rather than at random Rats tend to behave in the same manner.

The male hamster seemed to be less interested in hoarding and all males hoarded less than the poorest female hoarder. One male did not pouch at all during the 14 days and frequently slept during part of the hoarding period. The male hamsters were easier to handle and did not seem to be upset by the experimental conditions.

It is doubtful whether or not the concept of "non-hoarder" as applied to rats which fail to hoard an arbitrary number of pellets, applies to the hamster. Six of the eight subjects in this group hoarded in excess of 10 pellets on each of the 14 days and the remaining two hoarded in excess of 10 on one-half of the days. As three pellets per day constitutes satiation feeding, it is obvious that much more food than is required is stored.

D. SUMMARY

The present investigation was concerned with the value of the golden hamster as a subject for hoarding studies. Some quantitative and qualitative data on hamster hoarding behavior are presented and compared with hoarding by the white rat.

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THE DEVELOPMENT OF VISUO-MOTOR PERFORMANCE ON THE MARBLE BOARD IN NORMAL CHILDREN*

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A. PROBLEM AND PROCEDURE

This study deals with the qualitative and quantitative aspects of visuo-motor development in normal children, as revealed by the performance on the marble board. The marble board test consists of two identical boards 11 inches square, and two sets of marbles, one black, the other red Each board contains 10 rows of 10 holes each, these holes, into which the marbles are to be placed, are ⅜" in diameter and centered one inch apart The examiner places the board on which the pattern has been arranged above and to the left of the child's board. The mosaic pattern to be copied is constructed by the examiner out of the sight of the child Six patterns are used.[2] No time limits are set. The examiner, using a blank on which a scheme of the board has been drawn, records each move in sequence. This record not only indicates the errors; it serves also as a substitute for a moving picture recording, making it possible to analyze the visuo-motor process qualitatively

The marble board has been previously used by Werner and Strauss (7, 8) as a diagnostic instrument for differentiating between clinical types of mentally deficient children The necessity for qualitative analysis was brought out by the fact that the final performance of each child, as indicated in terms of correctness, was not a sufficient measure for differentiation. It was found that a seemingly perfect result might be obtained without a well-organized procedure or even without the ability to clearly perceive the pattern. Mentally retarded children whose retardation was due to brain-injury performed, for the most part, incoherently, whereas the generally feebleminded (familial) children proceeded in a well-rounded, continuous manner. A further study by Werner (5), using the same test, dealt with the development of visuo-motor performance of mentally deficient children

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[1] The authors acknowledge their indebtedness to the superintendent and the teachers of the West Boylston, Massachusetts, school system

[2] The six patterns employed are reproduced in a previous issue of this journal (5, p 270)

without brain injury, ranging from 7-11 years of mental age with a mean *IQ* of 67.5

In order to be usable as a diagnostic instrument information about the marble board performance of a sufficient number of normal children is needed. The present study serves that purpose.

The subjects, 120 normal children, ranged in chronological age from 6 to 12 years; there were 20 children in each of the following groups: 6.0-7.0; 7.1-8.0; 8.1-9.0; 9.1-10.0; 10.1-11.0; 11.1-12.0 years. The mean *IQ*, taken from scores obtained on the Otis Quick Scoring Mental Abilities test, was 105.6; the median, 106; and the interquartile range, 102-108. The mean chronological age for the whole group was 8 years 3 months.

The analysis of the performance on the marble board was carried out separately for chronological and mental age levels.[3] There were three parts to this analysis, one quantitative and the other two qualitative. The first part dealt with correctness of performance. The second part concerned motor procedure, allowing insight into the method of work in terms of the sequential order of marble placements. The third part of the analysis was directed toward the configurational organization of the task, i.e., the perception of the sub-forms of each pattern with respect to the whole.

B. RESULTS

1. *Correctness of Performance*

Tables 1 and 2 summarize the results with respect to the mean number of patterns correctly produced by the members of each chronological and mental age group.

TABLE 1
CHRONOLOGICAL AGE AND MEAN NUMBER CORRECT PERFORMANCE

CA	Mean	Sigma	*p*	p_1
6/ 7	1.58	1.54		
7/ 8	2.10	1.45	$<.01$	$<.01$
8/ 9	3.70	1.95		
9/10	4.10	1.57	$<.02$	$<.01$
10/11	5.05	.73	$<.01$	
11/12	5.85	.36		

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[3] In order to obtain an even number of subjects at each age level, seven children of the *CA* groups had to be exchanged for seven others included in the *MA* groups

TABLE 2
MENTAL AGE AND MEAN NUMBER CORRECT PERFORMANCE

MA	Mean	Sigma	p	p_1
6/ 7	.55	1.05		
7/ 8	.75	1.43		
			$< .01$	$< .01$
8/ 9	2.60	2.22		
			$< .05$	
9/10	3.90	1.46		
				$< .01$
10/11	4.40	1.77		
			$< .01$	
11/12	5.75	.79		

The results demonstrate a steady increase of correctness with increase of chronological and mental age. Whereas, as Table 1 shows, only 1½ patterns in average were performed correctly by the 6-7-year-olds, nearly all patterns were correctly constructed by the 11-12-year-old children. The improvement proved to be statistically significant (according to Fisher's t-test) between the following chronological age groups: 7/8-8/9, 9/10-10/11, 10/11-11/12. With reference to the mental age, significant differences were found between the following age groups: 7/8-8/9, 8/9-9/10, 10/11-11/12 (Table 2).

When successive age groups were combined (6-8, 8-10, 10-12 years), the significance of difference in accuracy between these combined groups was found to be at the one per cent level of confidence throughout (Tables 1 and 2, p_1).

2. *Sensori-Motor Types of Performance With Regard to Sequence of Moves*

Earlier studies have demonstrated that children complete the task of pattern construction on the marble board through the use of different methods in regard to sequence of moves (5). In accordance with Werner's previous study, the following types of such sensori-motor procedure have been distinguished (Figure 1):

The *"continuity"* type refers to the placement of marbles in terms of continuous movements following the same direction (Figure 1*A*). The *"constructive"* type of performance relates to the manner in which the child builds the subforms of each pattern. Here, the figure is enclosed from two sides, rather than being built in one continuous direction (Figure 1*B*). A method is referred to as *"Partly-constructive"* when one of the subforms of the pattern is completed in a continuous manner, while the other is

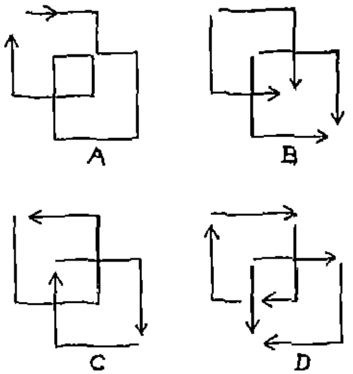

FIGURE 1
SEQUENCE OF MOVES (ARROWS INDICATE DIRECTION OF MOVES)

built constructively (Figure 1*C*). An *"irregular"* procedure is defined as a performance displaying no discernible method of work (Figure 1*D*).

The results with respect to sensori-motor types of performance have been summarized in Tables 3 and 4. The tables indicate that the continuity type, though predominant at all levels, declines with the increase of chronological and of mental age. On the other hand, the partly-constructive, as well as the constructive, type of performance increases with chronological and mental age. The irregular type of performance is relatively infrequent and fluctuates in occurrence between the age groups.

Since the significance of these genetic changes from one age group to the next was found to be low in many instances, we combined successive chronological age as well as mental age groups Such combinations (6-8· 8-10· 10-12 years) yield significant differences (p_1) at the one and two per cent levels of confidence for the continuity, for the partly constructive, and for the constructive types.

3. *Performance in Terms of Configurational Organization*

Individual registering of the marble placements on the record sheet makes possible the developmental analysis of the subject's procedure with regard to *form* as a guiding principle in visuo-motor performance. The following types of organization can be distinguished (Figure 2):

1. *"Highly articulate"* performance consists in a construction whereby the whole pattern is built out of its subforms. This performance indicates that the child perceives clearly the relation between the subforms with respect to each other and to the whole (Figure 2*A*).

TABLE 3

Sequence of Moves and Chronological Age Mean Number of Figures Per Child

CA	Continuity	p	p_1	Partly constructive	p	p_1	Constructive	p	p_1	Irregular	p	p_1
6/ 7	4.55			90			10			45		
7/ 8	4 60			85			30			.25		
		< 02	<.01			< 02			< 01		< 05	< 01
8/ 9	3 60			1 40			35			65		
								< 10			< 01	
9/10	4 10			1 30			60			0		
		<.01	<.01			< 01		< 05	< 01			< 01
10/11	3 10			1 40			1 15			35		
		< 10			< 01							
11/12	2 55			2 05			1 25			.15		

TABLE 4

Sequence of Moves and Mental Age Mean Number of Figures Per Child

MA	Continuity	p	p_1	Partly constructive	p	p_1	Constructive	p	p_1	Irregular	p	p_1
6/ 7	4 85			85			15			15		
											< 01	
7/ 8	4 50			70			10			.70		
			< 01			< 01			< 01		< 02	
8/ 9	4 50			1 00			30			20		
		<.05			< 10							
9/10	3 50			1 55			45			55		
			<.01			< 01			< 01			
10/11	4 00			1 25			.50			25		
11/12	3 20			1 40			80			60		

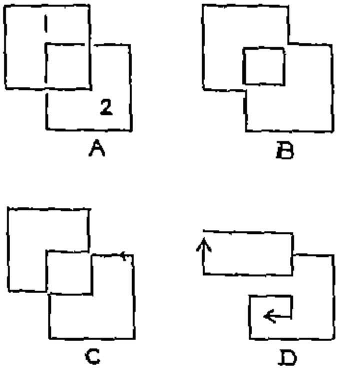

FIGURE 2
CONFIGURATIONAL ORGANIZATION (STRUCTURE OF PATTERNS AS REVEALED BY CHILD'S PERFORMANCE)

2. Lower types of organizations are indicative of some lack of comprehension of this interrelationship. Either the whole or the parts dominate as visual guides.

(*a*). *"Global Type":* If the whole dominates, the child follows primarily the outline of the pattern, placing into this frame remaining parts of the configuration (Figure 2*B*).

(*b*). *"Aggregate Type":* In contrast to the global type, the child may be guided in his performance by relatively self-contained parts. The smaller portions of the pattern are then completed as though they were separate units which are banded together in a loose manner. Figure 2*C* illustrates this organizational type.

Developmentally, both, the global and the aggregate types of organization are indicative of an earlier genetic stage at which the analytic-synthetic relationship more commonly found at higher levels is lacking (6). In view of this genetic similarity the two types of organization have been statistically treated together.

3. In contrast to the proceeding types, *lines* rather than forms may determine the performance. In certain of these cases comprehension of the form of the pattern may be completely lacking, whereas in others, though the line trend is clearly pronounced, some of the form may be still perceived. An example of the linear type is given in Figure 2*D*.

As Tables 5 and 6 show, the highly articulate type of configurational organization increases steadily with chronological and with mental growth.

TABLE 5
CONFIGURATIONAL ORGANIZATION AND CHRONOLOGICAL AGE

CA	Highly articulate	*p*	*p*₁	Global aggregate	*p*	*p*₁	Partial line	*p*	*p*₁	Line	*p*	*p*₁
6/ 7	18 33%			23.32%	< 02		29 20%			29.20%	< 05	
7/ 8	19 16	< 02	< 01	37 49	< 10		30 86			12 49		< 01
8/ 9	32.49			30 82			23 32			13 33		
9/10	37 50	< 02	< 01	35 82			21 66		< 01	5 02		< 05
10/11	45 82			32 49			15 83	<.02		5 86	< 02	
11/12	48 35			40 82			9 16			1 67		

TABLE 6
CONFIGURATIONAL ORGANIZATION AND MENTAL AGE

MA	Highly articulate	*p*	*p*₁	Global aggregate	*p*	*p*₁	Partial line	*p*	*p*₁	Line	*p*	*p*₁
6/ 7	17 80%			31 70%			20.50%			30 00%		
7/ 8	20 00	< 01	< 01	29 50			23 50	< 01	< 05	26 90		< 01
8/ 9	33 30			33 40			12 50	< 01		20 80	<.02	
9/10	35 10		<.01	32.90			22 00			10 00		<.01
10/11	35 80	< 01		30 91			25 80	< 01		7 49	< 02	
11/12	45 80			40 68			11 72			1 80		

A performance by less articulate types of organization (global-aggregate) varies insignificantly with increase in chronological and in mental age The linear type of performance declines with increasing age.

If two successive age groups are combined (6-8, 8-10, 10-12), the increase in highly articulate and the decrease in linear procedure becomes significant at the one per cent level (Table 5, p_1 and Table 6, p_1) The global-aggregate forms of organization show no significant changes

C. Discussion

1. *The Relation between Correctness of Performance, Sequence of Moves, and Types of Organization*

The basic assumption of this study is that correctness of performance is not sufficient to adequately reveal the true nature of visuo-motor development. With regard to any performance test, two subjects may complete the task correctly, but one may operate on a less mature level while the other may work on a higher developmental plane. Accordingly, the performance on the marble board was evaluated qualitatively as well as quantitatively. In addition to the measure of accuracy, the analysis was directed toward types of sensori-motor performance and toward perceptual organization of form.

Correctness of performance, within the age levels considered, appears to be clearly a function of chronological as well as mental age.

With respect to *sequence of moves,* there is a definite indication of a decline in the continuity type of procedure as chronological and mental age increase. The continuity type, as it declines, is replaced by the constructive kind of sensori-motor procedure. These results are in line with developmental theory which implies that the earlier and more primitive types of visuo-motor activity tend to be in terms of continuous operations. Our findings concerning predominance of continuity as a characteristic of immature visuo-motor performance agrees with the study by Rice (3), one of the few investigations that attempt to analyze the types of movements made by children while drawing This investigator found that at an early age reproductions are completed predominantly in terms of continuous drawings without lifting the pencil from the paper or breaking the line.

As to *perceptual organization,* the study shows that, with chronological and mental growth, there is an increase in articulate perceptual behavior, concomitant with the decline of linear types of organization. Though the frequency of occurrence of the global and aggregate kind of organization does not significantly change throughout the ages, this does not necessarily indicate that the three types of organization might not developmentally be linked On the contrary, it seems probable that the frequency of global-aggregate forms remains unaltered because, from level to level, there occurs simultaneously a decline of the linear and an increase of the highly articulate type of organization A longitudinal study of individual children might well reveal that a shift from the linear to the global-aggregate type in a number of children may be offset by the simultaneous shift from the global aggregate to the highly articulate type of organization in other children of the same age groups

It is logical to assume that some relationship should exist between the sensori-motor and the mainly perceptual aspects of performance An attempt was made to study such relationship tentatively by means of graphs In Figure 3, the curves in the upper portion of the graph represent the percentage frequency of "form-guided" behavior Form-guided behavior is understood here as a performance about which one can be reasonably sure that the child perceives the configuration, and attempts to copy it Thus, the form-guided performance includes highly articulate, global, and aggregate types and excludes the partial-linear and linear types The lower curves represent

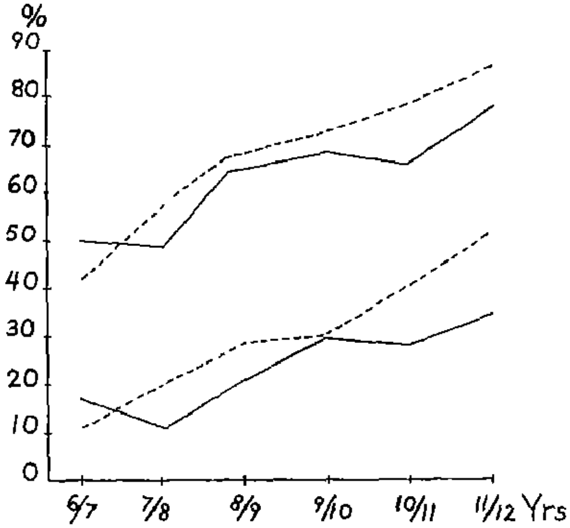

FIGURE 3

PERCEPTUAL ORGANIZATION VS. SENSORI-MOTOR PROCEDURE

Upper portion form-guided performance, lower portion constructive and partly-constructive sequence of moves Broken line *CA*, solid line *MA* the combined scores of the partly constructive and constructive methods of procedure leaving out the continuity type. The two chronological age curves are quite similar in shape, and so are the two mental age curves. This similarity indicates a genetic relationship between the sensori-motor types of procedure and perceptual organizations. Sensori-motor activity and perception are interdependent factors of the actual performance: performance grows through the increase in differentiation of all the interrelated functions involved (6).

2. *Comparative Analysis of Mentally Deficient and Normal Children*

a Accuracy A comparison of the present with the previous study by Werner (5) on mental defectives reveals that the performance of the retarded children has been superior to that of our normal subjects of the same mental age. This difference in accuracy is apparent at all the mental age levels (Figure 4). In order to attempt an interpretation of this superiority of the retarded over normal children, one should be aware of the fact that the *IQ* performance of mentally retarded and normal groups of the same mental ages differ with respect to the correct test items. Merrill (2) found that retarded children excel normals in sensori-motor skills. Similarly, McFadden (1) has shown that feebleminded children of

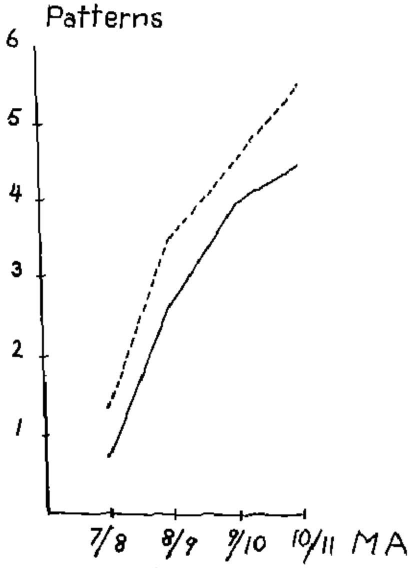

FIGURE 4
Correctness of Performance
Solid line, normal *MA*; broken line: retarded *MA*

corresponding mental ages surpass normals in certain practical motor items, such as tying a bowknot, arranging five weights in order, and making change Mentally retarded children are particularly impaired in items dealing with abstract verbal achievement, but tend to compensate for this by the use of items involving concrete performance. The higher accuracy of mentally retarded children on the marble board obviously reflects this greater visuomotor skill.

b. Relation between accuracy and qualitative types of performance In general, one should expect a clear-cut correspondence between increase in accuracy and in quality of performance. That this relationship does not necessarily hold has been demonstrated by Werner and Strauss (7, 8) They showed that the marble board test differentiated well between brain-injured and non-brain-injured children, particularly because of the discrepancy between accuracy and qualitative type of performance, observed in brain-injured subjects. Although a number of brain-injured children achieved objectively accurate performances, their methods of sensori-motor procedure, as well as their perceptual organization pointed to more or less severe disturbances; incoherence in performance and lack of figural relationships were commonly displayed.

In the following analysis, normal and generally retarded (moron and

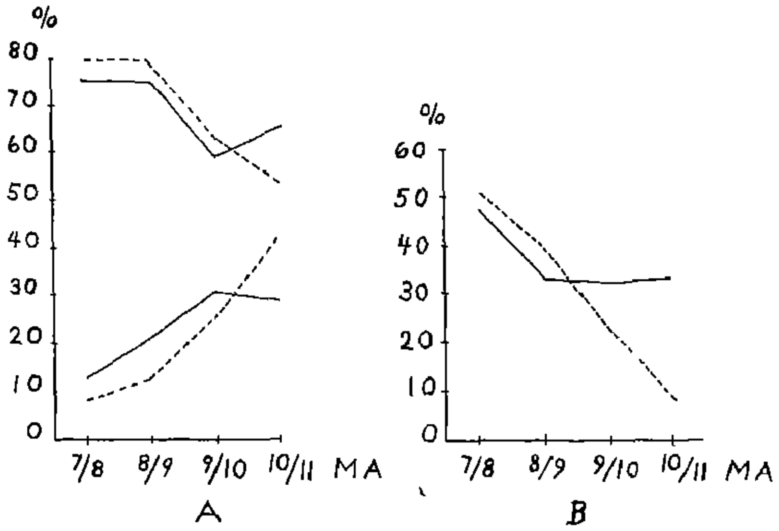

FIGURE 5
A. Continuity type of procedure (upper portion) and constructive and partly-constructive procedure (lower portion)
B Linear type of organization Solid line, normal *MA;* broken line retarded *MA*.

borderline) children are compared with respect to the relationship between accuracy and qualitative aspects of performance In Figures 4 and 5, some results of this study and the previous paper by Werner (5) have been combined. As mentioned above, the correctness score of the mentally retarded group is consistently higher than that of the normal group, however, this relationship between the two groups does not hold with regard to methods of procedure As Figure 5*A* demonstrates, up to, and somewhat beyond, the 9/10 mental age level, the retarded group shows a higher amount of continuity forms of procedure. Conversely, constructive and partly-constructive procedures are less frequent in the retarded group. Furthermore, the linear type of organization is more frequent in the retarded children up to and beyond the 8/9 year mental level (Figure 5*B*). This leads to the suggestion that, in retarded children of younger mental age levels, the pattern of performance in terms of accuracy, methods of procedure, and figural organization differs from that of normal children of comparable mental ages Although, as a group, those children are more accurate in performance, they appear to achieve that accuracy by less mature methods of sensori-motor procedure and at a lower level of figural organization.

D. SUMMARY

1. Quantitative and qualitative development of visuo-motor performance of normal children has been analyzed by means of the marble board test. This test consists of six mosaic patterns which are copied by the child. The subjects were 120 normal children equally divided into six chronological and mental age groups ranging from 6 to 12 years

2. *Correctness* Correct performances increase significantly with increase of chronological and mental age.

3 *Sensori-motor types of procedure* Throughout all chronological and mental age levels, the continuity type of sensori-motor procedure is dominant This performance, characterized by continuous sequences of marble placements, declines as normal age advances With increasing age, the continuity type is more and more frequently replaced by the "constructive" type of performance (enclosure of a figure from two sides).

4. *Perceptual organization.* A highly articulate type of figural perception is indicated by the construction of the complex pattern out of its subforms This organization type, involving the apprehension of part-whole relationship, increases with chronological and mental age Lower developmental types of organization (global and aggregate) vary insignificantly

A procedure guided by lines rather than by form decreases with chronological and mental age growth.

5 *Relation between sensori-motor procedure and perceptual organization* The developmental curves for the constructive types of sensori-motor performance and those for the procedures guided by the perception of form are quite similar in shape This similarity obtains between the chronological curves as well as between the mental age curves and is evidence of a genetic relation between sensori-motor and perceptual aspects of performance.

6 *Comparison of mentally deficient and normal children.* Our study suggests that mentally retarded children of lower mental age levels, compared with normal children of equal mental age, are more accurate in their final achievement on the test but, at the same time, display less mature methods of visuo-motor procedure and of figural organization.

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ASPECTS OF THE PSYCHOLOGY OF MEANING*

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A. Introduction

James (8, Vol. I, p. 265) identified the "dynamic" meanings of words with the fringes of feelings of fitness or unfitness to the contexts and conclusions of the sentences in which they occurred. He thought the "static" meanings of concrete words were the sensory images awakened, while the "static" meanings of abstract words seemed to be the other words aroused by their use, forming the so-called definition. We may extend James's idea of the fringe to apply it to meaning in general, as well as to words, and this extension McDougall (13, pp. 251 ff) both makes and criticises in his discussion of perceptual thinking. He himself puts forward, nevertheless, an account in which the meaning of an object, an idea or a thought consists in the mass of experiences and knowledge of this object or idea, and which determines our particular mode of approach to it on a given occasion. This mass he considers far richer than any imagery which he may discover by introspection as playing an essential part in the apprehension. Watson (23, pp. 354-5) has said that the meaning of a stimulus is the reaction it evokes, and this doctrine has been elaborated by behaviourists such as Markey (14, pp. 137-8). According to Stout (21, pp. 192 ff.) a "sense-impression or image has meaning in so far as it refers to something other than itself—in so far as it enables us to think of an object." Meaning is not always acquired, though the greater part of his discussion deals with the acquirement of meaning. Meaning may be acquired either through the formation of cumulative dispositions due to the working of retentiveness in its primary form, or from the retentiveness which is involved in reproduction and association. Huey (6, pp. 165-6) in his consideration of meaning in relation to reading, has in a general way accepted James's view The meaning of a word, sentence or passage read is the fringe of half-conscious feelings, images and ideas, which it tends to bring to mind. He would probably agree with Stout's view, that the dictionary gives us no more than the outline of verbal meanings, which can be determined in full only by the context in which words appear on a given occasion. This reminds us

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that Titchener (22, pp. 367-8) has treated meaning as the mental context of images and what are, according to his view, other derivatives of sensation, in which a given content appears to consciousness.

McDougall's view differs from that of James mainly by extending the fringe of feelings to include a mass of knowledge not all present to introspection at the time. There is an essential identity between Stout's view and that of McDougall, though Stout stresses the analysis of the effects of retentiveness, while McDougall wishes to emphasise the dynamic and organic character of mental life. Most writers, except the behaviourists, tend to make the central feature of meaning the content of experience, explicit or implicit, drawn into relation with a present object, word, or thought at the time of its use, the behaviourists translate the same essential notion into terms of physical stimulus and bodily reaction.

This paper will be occupied with a consideration of further views of meaning which have been put forward by Drever (2, Ch. III), MacCurdy (11, Ch X) and Bartlett (1, Ch. XII). It will be useful to draw attention to what Head has called "vigilance," and to discuss the psychological problem of nonsense. Perhaps a more generalised and central conception of meaning may be formulated, which will accord with the views of several different writers A special aim of this paper will be to show that unconscious meanings fit into this general conception without any difficulty.

B. Vigilance and Schemata

By his conception of vigilance Head (4, Vol. I, pp. 479 ff) has attempted to bridge the gulf that many people believe to separate psychology and physiology. This may be seen from one of his own favourite ways of expressing the relationships of vigilance, consciousness, and adapted reflexes. "Consciousness stands in the same relation to the vigilance of the higher centers as adapted and purposive reflexes [stand to the vigilance of the centers] of lower rank in the neural hierarchy." What the adapted and purposive reflexes achieve for the organisation on the lower levels of the functioning of the central nervous system, that consciousness achieves on higher levels, and at any level it is found that effective functioning is dependent on what Head has called the vigilance of the system at work.

The nervous system is not to be viewed as a purely mechanical contrivance To use Head's own illustration, it is not like a machine which responds by the issue of chocolate, cigarettes, or matches, according to the receptor chosen for the stimulus of a penny The stimulus applied to the chosen receptor, it is agreed, must be adequate, and the response obtained depends on the receptor chosen and its anatomical connections with certain effector organs, whether muscles or glands The capacity of the whole system to receive adequate stimuli and to make distinctive responses also depends on its structural integrity. Throughout his studies of neurology and of aphasia, Head has been anxious to show that two essential factors are concerned in the reactions of the nervous system, and these he called vigilance and schemata

The importance of vigilance may be seen clearly in the study of the stages in the recovery of human patients from severe spinal injury, of the reactions of spinal and particularly of decerebrate animal preparations, and in the effects of narcotic drugs and toxic substances on the functions of the nervous system. The human patient whose spinal cord has been severed by accident or injury at first suffers from spinal shock, in which the adapted and purposive reflexes of the nervous system below the level of the injury are abolished, and the lower extremities lie flaccid Urine and faeces are retained, and the skin is dry As the spinal cord recovers, more and more of the functions normally present and controlled in part by consciousness return, and regular habits of evacuation may be established If the patient becomes feverish from a secondary cause, and there is the absorption of toxic substances, these reflexes again disappear, but will return if he makes a good recovery. Similarly, a spinal cat preparation takes some time, perhaps about 20 minutes, to recover from the shock of operation. Then the characteristic reflexes of the severed portion of the nervous system below the division begin to appear Choloroform causes regression, however, but this will pass with the excretion of the drug from the system. In the decerebrate preparation the variations of degree of activity of the remaining parts of the central nervous system can be observed even more fully. A decerebrate cat may purr and will respond appropriately to various stimuli, such as the barking of a dog or the singing of a canary. Water placed in the pharynx is swallowed, but oil is not Several different adapted reflexes may be evoked from the pinna. The normal posture of such an animal is rigid extension, but, if put in a quiet place, it may relax as if in sleep Noise, jarring, or light contact will re-awaken it. Chloroform, which reduces the activity of the nervous system, will make the animal collapse, and abolishes the differential and adapted reflexes As the drug is excreted, reactions gradually regain their higher level of adaptibility.

Head has suggested the term vigilance to express these varying degrees of adaptive activity of the nervous system, and he points out that vigilance underlies normal habitual activities in man which have become automatic For instance, if the vigilance of the nervous system is lowered by illness or shock, the bed may be wetted at night, and many highly differentiated automatic reactions, such as found in shooting, tennis, reading, writing, speaking, or driving a car will be upset. Vigilance underlies conscious control and thinking, where these operate.

The vigilant responses of the nervous system also depend on a form of retentiveness which is not purely the mechanical accumulation of impressions, dispositions, or engrams, but is a mode of adaptive organisation. Only after specific injuries and illnesses, or when vigilance is greatly reduced, can parts of the body respond as if the reactions which have led up to their present postures had not taken place. When the hand is moved to pick up a matchbox, we do not have to take elaborate account of its present posture and of the position from which it has to be moved. The necessary condition of appropriate movement, that present posture should be taken into account in all the elaborate processes of muscular action, is unwittingly pre-arranged by schematic control. "By means of perpetual alterations in position we are always building up unwittingly a model of ourselves, which is constantly changing. Every new posture or movement is registered on this plastic schema and the activity of the cortex rings into relation with it each fresh group of afferent impulses, evoked by a change in the position of the body."

Again, as Bartlett (1) has often pointed out, in remembering we are profoundly dependent on schemata which are continually built up unconsciously as the plastic products of experience, and which form the basis for thought, recall, recognition, and perception, all of which are the results of past influences being continually brought into relation with fresh material coming from new experiences. In precise recall the task of consciousness is to split these plastic schemata into detailed fragments and make them re-appear as if artificially cut out from the accumulated past. It is like the difference between assimilation and articulate thought explained by Hobhouse (5). It is of striking interest that Katz (9) has arrived at a cosely similar conception to that of schemata in his attempt to account for the home-finding abilities of animals. The idea may also be applied to the delayed reaction experiments of Hunter (7, pp. 36-8), in which an "internal cue" seemed to direct the animal to the correct food-box after varying intervals of time had elapsed since the directive stimulus had been withdrawn.

The schemata discussed by Bartlett must not be regarded as logical abstractions or as generalised ideas or images. There is nothing in the systems of schemata which corresponds, for instance, to the logical genus, such as of dog or spade. There is nothing logically generalised about schemata, though they are the products of massed effects of the past. Indeed they are highly particularised, because the last experience which is incorporated into a schema is always most heavily weighted in significance. The schemata discussed by Head are all determining factors in highly specialised actions, and after one response the schematic influences are all changed before the next takes place. Logical abstractions and generalised ideas imply the previous working of mental processes of analysis and synthesis already far above the schematic level of organisation, and are highly elaborated products rather than the beginnings of mental functioning.

Like the adapted reactions of the lower neural centers, conscious responses are also dependent upon vigilance and upon the integrity of schemata. The schemata provide a psycho-physiological context for thought and behaviour, and give it the basis of meaning. Head points out that the adaptive character of the reactions of the nervous system arise from three factors Firstly, there is the selection exercised amongst the "diverse and massive physical influences acting on the organism from without." Secondly, there is the "march of events" by which the past exerts a profound influence, so that any response is closely related to what went before, and the future is implicit in the present Thirdly, there are "the spacial influences in afferent impulses," which endow even non-conscious functions with projection, and through which, behaviour is governed by both space and time

We may say that the joint dependence of adapted reflexes in the lower, and of conscious responses in the higher functions of the nervous system, upon the vigilance of that system and upon the schematic organisation of the effects of past responses and experiences, provides the psycho-physiological basis of meaning A response or experience is meaningful if it results from a vigilant organisation and depends upon the integrity of the schemata Most people may feel that meaning is in some special sense connected with consciousness. As will be seen later, Bartlett has met this difficulty to a certain extent by speaking of "reactive significance," rather than of meaning, at the physiological level.

C. Nonsense and Meaning

It is not possible to think of nonsense as that in which meaning is absent: rather nonsense is dependent on the presence of special kinds of meaning. Examples will make this clear. Edward Lear is generally regarded as a master of nonsense. If we turn to his *Nonsense Songs and Stories,* we find the following passage (10, p. 101) for example, in *"The Story of the Four Little Children Who Went Round the World."*

> After a time they saw some land at a distance, and when they came to it, they found it was an island made of water quite surrounded by earth. Besides that, it was bordered by evanescent isthmuses with a great Gulf-stream running about all over it, so that it was perfectly beautiful, and contained only a single tree, 503 feet high .

Such a passage is not contrary to James's conception of meaning, and indeed, we are well conscious of the fringe of feelings which give the impression of the fittingness of all the words. This is so marked that we might even overlook certain peculiarities of the passage which have led its author to include it in a book of nonsense. We must look at it carefully in order to be sure that these peculiarities really exist. On closer inspection, it also becomes less nonsensical than it appeared at first, because we recall that the travellers who discovered the island sailed to it in a boat. It is not only cleverly constructed to look meaningful, but also to look even more like nonsense than it is.

This passage, and others like it, are only nonsense because they fail to fulfil certain expectations about what a meaningful passage should be. They are not nonsense absolutely, but only relatively. A critic who approached this passage and asked how a great gulf-stream could run about all over an island which consisted of water quite surrounded by earth, and how, if this were possible, it could make the island perfectly beautiful, would not be taken seriously. He would be misunderstanding the passage, and by failing to apprehend it meaningfully, would make himself ridiculous. The critic who approaches it and asks what indeed it does mean, is more serious. The great popularity of Edward Lear's work testifies to its meaningfulness, and its meaning certainly lies to some degree in the excitement of our interest, but, superficial expectations of ordinary meaningfulness are thwarted, and the remaining problem of explaining what the deeper meanings may be is a formidable task which will not be attempted here. It is sufficient to say that the frustration of normal expectations, far from rendering the passage strictly meaningless, serves to add to the excitement and to emphasise its interest.

The words of Edward Lear's nonsense are chosen with subtle wit. In another kind of nonsense words are deliberately chosen at random. For example, the following words were used in a psychological experiment on memory. They were chosen in a random manner to make a meaningless list of two-syllable adjectives

sunny liquid wretched yellow handsome patient ugly active shady limping

This list is a good example of the impossibility of eliminating meaning by random arrangement, though some random arrangements are less fraught with meaningful possibilities than this particular set of words To most subjects of the memory experiment it seemed to be a highly interesting passage To one subject in particular it awakened an image of the road leading to the out-patient's department of a big hospital, along which an active and ugly, but at the same time handsome patient was limping He was wretched, and was yellow with billiousness It was a sunny day and the sunlight brightly illuminated big bottles of yellow liquid in a neighboring chemist's shop. The fluid in one bottle seemed to reflect the colour of the patient's face, and, not only was he trying to walk in the shade of some plane trees, but he was also a suspicious and shady character. Further introspection led to the recall of various emotionally toned incidents in the subject's life, which seemed to be condensed into the one complex image It revived memories of an examination in chemistry, of another in bio-chemistry, of an attack of sciatica, and of the plight of a French friend, who made a walking tour in Glancoe in March, and had to be treated in hospital for the blisters on his feet afterwards. It is not possible to eliminate such meanings as these from random groups of words with certainty, even if the words themselves are reduced to random groups of letter-sounds such as nonsense syllables (17)

The meaningfulness of nonsense made of random arrangements of sensory material, of words or of shapeless patterns, may be said to depend on the peculiarities of the subject's imagination, and on the accidents of circumstance which make the material more or less appropriate to it. Limiting conditions can be conceived in which the subject has no imagination and there is nothing in his mind to which the material can be appropriate. In another limiting condition the material can be thought of as absolutely inappropriate to any aspects of the subject's imaginative activities. In view of the possibilities of unconscious meanings, however, which will be discussed later, it is safe to view these limiting conditions as included merely for the sake of completeness To all intents and purposes they do not exist

Another kind of nonsense is found in dreams and in the ideas and talk of psychotic and neurotic patients. To take a simple example, a man suffering from an obsessional neurosis feared that he might succumb at times to the sudden impulse to say a "bad word," and found it necessary to carry out some odd action which was a kind of sacrifice to expiate his guilt. He was also afraid that he might die of poisoning through eating his bread off a bare table which had been swept with the same brush that was used for the floor, and that if he did die in that way it would be suicide. Such ideas and impulses might be said to be nonsensical. This is a very large and varied class of nonsense, and includes several subdivisions, which it would be important to distinguish in a study of dreams and mental symptoms. For the present purpose dreams, obsessional ideas, psychotic nonsense, and their allies are usefully grouped together and contrasted with the other kinds of nonsense already mentioned, because their construction depends less upon deliberate intention, or upon the unintentional interpretation of random arrangements of material, than upon the pressure of unconscious impulses which break down the normal balance of the ego, either for the moment or permanently. It has been shown over and over again that dreams are highly meaningful (3), and there is good reason to suppose that psychotic nonsense would appear equally significant whenever adequate clues to its meanings could be gained (12, pp. 63-8). This is also true of obsessions and other mental symptoms.

In general we may say that material appears nonsensical because it conflicts with certain expectations of meaningfulness, since its significance lies in unexpected directions. This is clear if we consider the kind of nonsense which consists in failing to be logical. To be illogical is to talk nonsense only if it is previously assumed that all meanings must be logical, and failure to be logical falls into line with other kinds of nonsensical thought. Hitler appeared to talk nonsense when he stated that peace was his aim, but only because his notion of peace was based on the presupposition of the destruction of the British Empire. The consecutive ninths found in the bass part of the piano accompaniment of the Sonatine for clarinet by Darius Milhaud are nonsensical only if we presume that such progressions cannot be used meaningfully in music. Illogical statements may be exceedingly meaningful from the psychological point of view, and, indeed, the mind does not select even illogically connected words without expressing something, and wherever there is expression there is meaning. Many examples of grammatical nonsense can be found in the study of aphasic disorder (4), but all of them represent effort towards the expression of meaning.

D. MEANING AND INTEREST

In pursuing the analysis of "instinct-interest," Drever (2) has come to the conclusion that it is essential to distinguish primary and secondary meaning, broadly in conformity with Stout's treatment of these, but he has come to view the primary tissue of meaning as instinct-interest. "It seems clear," he says, "that, in order that an object should have any meaning for us, there must be a reference to something that is not in the object, but in us." Primary meaning he defines as "the feeling of relation between an object or situation and an impulse towards that object or situation, that feeling being best described as interest or 'worthwhileness'." He also takes the view that we cannot apply the term meaning to any factor determining conscious activities which is not in consciousness at the time. He gives a clear account of interest-meaning, and explains that the meanings of familiar objects, such as a cricket-ball, for instance, depend on the context of interests into which they enter. The meaning of the perceptual situation is primarily in its relation to the person's aim, purpose, or need at the moment.

An unfamiliar object which is consciously experienced in relation to any impulse or need may be said to be invested thereby with primary meaning. Secondary meaning arises through the pointing forward of present experiences to coming and related experiences, and is based upon primary meaning. It is both affective and cognitive, whereas primary meaning is purely affective. Secondary meaning expands into the wide tissue of "significances," which build up the technique of language and thought, and logical meanings are among its varieties. Primary meaning is felt when an instinctive impulse is awakened by a suitable object, and it lies in the relationship of appropriateness of object and impulse. Secondary meaning is developed in all those situations in which the relation of object and impulse carries us forward into future situations and satisfactions, however complex, in which our actions and thoughts tend to gather towards some aim, intention, or conclusion

Drever's expression of meaning in terms of interest is excellent. His summary is a clear statement, that "meaning is a relation, either of the situation to the self, or of the situation, as a part, to the whole of which it is a part, or of the situation, as a part of a whole, to the other parts of the whole." But it is difficult to accept the distinction of primary and secondary meanings. It is also difficult to confine meaning to conscious states.

When the meaning of a cricket ball, to use Drever's example, is determined for us by our interest in the game, we are not aware of all aspects of that meaning. Indeed, as Head has argued, consciousness of all the schemata determining our meaningful behaviour at cricket might easily spoil our play. In such a tense situation as a game of cricket, consciousness of aims, purposes, and impulses, may be greatly reduced, so that we are aware of nothing but that we see ourselves carrying out adapted acts and wonder how our muscles do it. Moreover, it will be necessary to consider what makes a man interested in cricket, and establishes for him the vast range of meanings condensed in the ball and in his responses and attitudes to it and to his opponent. The meaning of cricket will be difficult to understand if we confine it strictly to what is in consciousness at given moments of time.

With regard to primary and secondary meanings there are two great difficulties. One is the problem of deciding when meaning ceases to be primary and becomes secondary. If the criterion is Stout's, that secondary meanings are determined by the operation of revived experiences in which the past influences the present in other and more complex ways than that of immediate retentiveness, then it seems that all meanings must partake to some extent of the secondary quality. It is very doubtful if any psychologist has ever actually observed the limiting condition, in which meanings are purely primary, because they are determined by immediate retentiveness alone. Surely it would be an academic question in psychology whether there may be one instant of time in which the enclosing shell has no more than primary meaning to the chick which is trying to get out It is difficult to base important psychological theories on the answers to questions like this, and tempting to conclude that Stout's primary meaning does not exist. If the criterion is Drever's, that secondary meanings arise through the complex mental syntheses and the consequent pointing forward to the future of experience, then again, all meanings seem to be to some extent secondary. The simplest instinct experience or impulse points forward. The idea of a limiting condition, in which there was no forwardness of experience would seem to be unacceptable. In Drever's discussion it would be necessary also, in my opinion, to object to the view that primary meaning is affective alone and secondary is both affective and cognitive. No affective condition can be found which does not partake of cognitive qualities in some measure, and no cognitive condition which does not partake of affect to some extent.

These objections might be met by saying that in the most primitive organisms there is no such continuity of experience as we are able to describe in ourselves by introspective analysis. At the level of the Protozoa, Coelenterata, or Vermes it might be thought that there is no cognitive consciousness or recognition As James pointed out, however, the polyp which has the experience of "Hollo! Thingumbob again!" is in some sense a conceptual thinker; and it would be a dangerous hypothesis that the lowest organisms have neither cognition nor recognition, even of the obscurest kind This makes primary meaning seem a very doubtful conception, and also relatively unimportant, even if its existence could be definitely proved.

Apart from these objections, Drever's contention that meanings are essentially located in interest, and exist through the relations of impulse and object or situation, carries the study of meaning an important stage further It is now possible to understand nonsense more clearly Nonsense is meaningful because it excites or expresses certain interests, greatly depending in detail on the peculiarities of the individual concerned. For example, many kinds of nonsense are meaningful because they excite the interest of humour It would be difficult to understand nonsense, as well as ordinary meanings, if we confined the notion of meaning to consciousness Head's notions of schemata and of vigilance of the nervous system carry the idea of meaning towards the levels of organic response at which conscious syntheses do not exist Later, in the discussion of unconscious meaning, we shall have to consider another kind of meanings which are independent of conscious control

E MEANING AS PATTERN

MacCurdy (11, Ch. X) has sought to separate meaning altogether from what is to be called perception in the strict sense in which he proposes to use the word. The term meaning is properly applied, he thinks, when response occurs to a perceived object in such a way that it may seem to an observer of the whole reaction to have been perceived as something other than what it is Thus, a door-wedge is needed, but a screw-driver is taken for this purpose. The screw-driver replaces the wedge, and, to an outside observer it would appear that the person who used it had seen a wedge. Changing its normal context or background of attendant reactions, which generally cause it to be perceived as a screw-driver, the object becomes a substitute for a wedge It is under such conditions, vastly expanded and complicated, that meanings as we commonly think of them arise. If there were no substitution of objects perceived, or of other conscious contents for each other in the solution of problems of behaviour and thought, then the psychology of meaning would not exist. It is by such substitutions that ordinary objects come to stand for ideas, impulses, and emotional responses, and that gestures, signs, and words are developed into conventional expressions and language

It is easy to understand the expansion of meanings on MacCurdy's theory. This is largely the same in essence as the development of Stout's and Drever's range of secondary meanings What is difficult to understand is the detachment of the idea of meaning from perception, and the special treatment of perception itself. This paper is not concerned with the idea of perception, as expressed by MacCurdy, but it seems that the attitudes of human beings to perceived objects are so complex that the limiting condition of perception, without "psychological" meaning at all in his sense, must be so rare as to constitute no psychological problem. It is unlikely that the perceptions even of animals would be so simple. The notion of perception, without psychological meaning, seems, like the idea of primary meaning, to be a fiction.

Apart from this difficulty MacCurdy's treatment of meaning is important, because he points out that the study of meaning is the study of associated reaction patterns, which is of the greatest interest where the distortion from dictionary meanings is most glaring, as in psychopathological material. He cites the example of a depressed and anxious patient, to whom hearing the word "lobster" meant that he was going to be boiled alive. This reminds us that the study of meaning is likely to lead far into the problems of what are ordinarily called unconscious meanings. It is to be noted that MacCurdy wishes to use the term significance for meanings which are not in consciousness at the time when they operate, and to confine the term meaning to definitely conscious experiences. This is quite sharply contrasted with Drever's wish to use the term significance for the most elaborated of conscious meanings, but such terminological differences are of no great importance because they do not affect our understanding of the underlying ideas.

MacCurdy points out that meanings may express themselves in three ways, or partly in all three at the same time. They may be exhibited in behaviour, in affect, or in conscious knowledge of associated patterns of behaviour and thought. As this part of his theory is very interesting, and is only briefly touched upon by himself, it may be expanded usefully. If a man meets a cow in a byre the meaning of cow for him may be expressed in terror which makes him unable to enter the building, gives him a cold sweat and tremor in the voluntary muscles; it may be expressed by his going up to the beast indifferently and milking it into a pail; or it may take the form of elaborate ruminations on the zoology of the vertebrate skeleton, with special reference to the changes brought about in the cow by domestication. All these modes of response may be variously combined according to circumstances which determine the expression of meanings in a given man on a given occasion.

Upon MacCurdy's theory of patterns and their relationship to mental and physiological responses, the emotional reaction to the cow is determined by unconscious patterns, such as trains of associated image-functions, which do not themselves enter consciousness, but which, nevertheless, influence experience and behaviour by the production of affective and emotional reactions. These reactions are in general appropriate to some other situation than the present, and the emotion is therefore the meanings of cow at the time when the man meets the animal. Cow, for instance, may, for the given individual, stand unconsciously for bull, and bull for the terrifying father-image appropriate to the Oedipus situation of childhood or infancy, and not now actually present to consciousness, nor appropriate to the man's present life. It is then understandable why cow should have such an extreme and apparently mysterious power to frighten the man in question.

The patterns which issue in relatively unfeeling behaviour such as every-day milking, are acquired motor skills and responses which are related to the ordinary life of the man, probably a farmer or byre-man, who has learned to look upon cows as no more than useful beasts, and to drive them about with a stick and milk them as part of his daily work. Here the explanation of the development of such patterns of response takes us back to the problems of why a man should become a farmer or byre-man and learn milking. If we followed these questions up we should find that there was again a long chain of unconscious patterns linking up the daily life of the adult with the sublimations, sentiments, and other expansions of infantile interests into the normal relations of the adult with the objective world around him

The third kind of meaning consists in a consciousness of the patterns themselves as objects of thought and interest. They are not all present to consciousness, of course, because there will be the same kind of unconscious background of sublimated responses as we indicated before, but the relationship of zoological knowledge about cow's skeletons to every-day life in the simple objective sense is much less direct than that of sudden terror or of ordinary milking. For this reason such knowledge might by some people be called impractical and useless. It seems an end in itself, although the zoologist earns his living by it. He is interested in ideas about cows, about skeletons, and about the domestication of animals, and only some of these might issue in direct action. They represent many of the patterns linking his responses together and underlying them, and his awareness of these ideas is an awareness of the patterns which have become objects of thought. Hence the secondarily introverted nature of thought and knowledge, even when its ostensible objects are such practical things as cow's skeletons and problems in applied science. When these ideas are themselves the objects of thought, we can say, with MacCurdy, that the meaning of the object lies in knowledge of associated patterns.

F. MEANING AND SITUATION

In a somewhat more detailed treatment of meaning than that given by MacCurdy, Bartlett (1, Ch. XII) has stressed two aspects of the problem. He has said that meaning is present when the "significance" of any constituent part of an organised setting of psychological material goes beyond its descriptive character and when it "leads on to" some other and related part. He has also explained that meaning cannot be fully understood either in terms of organisations of motor responses or in terms of arrangements of psychological material; that both are required, and, in addition, the relevant functioning of more or less specific active tendencies. It is then that we can speak of a psychological "situation," to which response is made, rather than of a "stimulus." Meaningful responses depend upon the organisation of psychological material in accordance with active tendencies which are dealing with the situation in which the organism is placed. They always lead on to new responses and to new situations, and often to the development of new active tendencies, and this forward orientation is an essential of meaning.

Bartlett's conception of meaning arises out of his wider studies of perceiving, recognising, and remembering, and in these he makes much use of an adaptation of Head's notion of schemata. In the lower level organisations of psychological material a schema, or groups of schemata, are built up which are primarily formed in temporal sequence. As each new impression is incorporated into the schema, it is the most heavily weighted in significance because it is the latest, and it influences the behaviour most effectively. The schemata are not fixed traces, but continually change and grow, and, since they determine the reaction to be made to the next incoming impression, they are the basis of memory below the conscious level. In order to grapple with environments which are not fully standardised themselves in mechanical sequences, but are unexpectedly variable, the higher organisms have been forced to adapt themselves by outgrowing the time-ordered schemata. We can imagine a limpet or sea urchin requiring nothing beyond schematic organisation of impressions and responses. The limpet's behavior is carried out within firm boundaries set by the rocks on which it has made regular tracks since it grew out of its larval stages. Further limits are set by the regularly changing tides of the sea and seasons of the year. It parades a narrowly fixed territory to find food and a mate Its responses are not mechanical, but they are, in Head's sense, schematic. Even when we reach the level of mammals, for instance, we find that rabbits and hares tend to follow established runs to their feeding places, and, if snares are set at irregular intervals of time, and left in place for no more than two or three nights at each setting, many animals may be caught in a good run, over a period of years. To a greater extent than most animals, man has become adapted to meet sudden and varied changes of circumstance, in the face of which special items of past experience must be abstracted from their massive settings and handled in terms of their appropriateness or other relationship to the present. Otherwise it would not be possible for a man to understand the simple technique necessary to outwit rabbits and hares, and to kill them year-in year-out in their habitual runs. A particular spot must be singled out as the appropriate place to set the snare. It must be separated from its general background and identified by specific memory. It is then that the schematic organisation of experience breaks down and is replaced by conscious apprehension of relationships and by detailed remembering The latter is always more like an effort to recontruct the past, as applied to the present, than it is like a mechanical revival of fixed neural traces, dispositions or engrams. Rote recall is a special and narrow class of recall and is not the type of all remembering as so often assumed in the psychology of education.

To Bartlett the breakdown of schemata seems to be the characteristic point of the appearance of conscious responses In consciousness it is possible to single out particular items of experience from the mass and to make them the centers for reconstruction of actively remembered past events Then remembering appears to have what seems to be its distinctive form. It is the active reconstruction in consciousness of past details, centering round the excitement of some active tendency, and weighted round about by the clinging organization of related schemata. Remembering is a form of response to a situation, and is meaningful, because the material organised or re-organised in the act of recall leads forward to the solution of some problem with which the organism has been faced, and towards the establishment of new organisations of material and new modes of response

In his study Bartlett takes the view that we must distinguish between "reactive significance" and meaning in the narrower sense, which is typically conscious but may have equivalent unconscious forms. Reactive significance is the parallel of meaning where there is no consciousness, and where no kind of evidence of the presence of ideas, images, or other conscious material could be found by hypnosis, in delirium, or by other means. It is the sort of significance for psycho-physiological responses which preceded consciousness of meaning in the evolution of organic life, and which underlies the subsequent development of meaning. In so far as we are able to say that the decerebrate cat appears to act as if it knew what it was doing, schemata provide the reactive significance of its responses. In the example of post hypnotic suggestion, where a conscious subject gives rationalised explanations of his desire to carry out the suggested act at the right moment, but can be shown under subsequent hypnosis to have acted because of the unconscious memory of the hypnotist's suggestion, we can speak of unconscious meanings in the act, and they underly the rationalised explanation.

The conception of meaning put forward by Bartlett is closely related to MacCurdy's and to Drever's notions. In his attempt to define a psychological situation, and to relate meaning to that, Bartlett has formulated somewhat more elaborately much of what lies essentially behind the conceptions of meaning as related to interest on the one hand, and to patterns of mental organisation and response on the other. Bartlett has, in a sense, combined these two ideas. Interests are represented by the active tendencies of his theory, and patterns by the organisations of psychological material of which he speaks. He has claimed that together these conditions determine meaningful responses.

The value and significance of Head's concept of the schema, and of Bartlett's application of it in psychology, have been discussed in important and illuminating papers by Wolters (24, 25), and Oldfield and Zangwill (26).

G. Unconscious Meaning

There are many aspects of behavior, of ideas and impulses, which are not easy to understand unless we take unconscious meanings into account more fully than Bartlett does in his study of remembering.

It is commonly said that the hypothesis of the unconscious in psychology is demanded chiefly by problems of abnormal perceiving, thinking, and acting, by psychopathology. Rivers, for example, made the unconscious understandable to a great many people by his very interesting biological theory of its origin and nature (19), but neither in this theory nor in his study of dreams (18) does he give the impression that the unconscious is as closely related to every-day normal life as it must be. Pursuit of the approach that the unconscious is chiefly demanded by the abnormal in psychological theory tends to lead to the tacit supposition that it is not relevant to normal conditions of mind, and to the view that it does not affect every-day life except in the production of symptoms of various kinds. In order to avoid this presupposition the instances which follow have been chosen because they bring us into contact with relatively normal rather than abnormal problems.

There are many farmers and others who continue to snare rabbits during the breeding season They give the excuse, perhaps, that they wish to keep the number of rabbits down, as there are far too many about. Many, however, are very glad to have the animals to eat, though they may not say so openly, but some are willing to eat the bucks only, and always bury the does. Others are willing to eat neither, and explain that rabbits in the breeding season are not good to eat, whether actually with young or not What is said of rabbits applies equally to hares. I have known a farmer catch six hares in a single night, in May, and bury five of them, complaining that they were females and useless. Some people are willing to make doe hares into soup in the breeding season, but will not eat the flesh. Now, it is remotely unlikely that any person served with rabbit or hare in the breeding season could say whether it was buck or doe, and if doe, whether it was killed with young or not. The writer, in need of meat to supplement wartime rations, has persuaded a farmer to give him doe hares with young instead of burying them, and has found them good to eat. It seems that the fear of eating doe rabbits and hares in the breeding season is a popular superstition, and it poses many interesting psychological problems, which would be very difficult to solve in terms of purely conscious meanings, though any person who fails to share this superstition might be regarded as abnormal.

Another instance is that of an unmarried woman in early middle age, who was afraid to use the toilet paper in public lavatories, and always carried about a private supply for use if needed. Such a fear takes us nearer to the abnormal than the fear of eating the flesh of a pregnant rabbit, but every reader will recognize that it is so common a kind of fear as to be almost normal, and it is closely related to the popular demand for disinfectant soaps and for medicated toilet paper Closely related again is the common habit of rinsing the fingers after going to the lavatory, but the amount of washing done is not usually sufficient to remove any dirtiness of a degree to call for serious cleaning It washes away the meaning of dirtiness, nevertheless, and is a little act of ritual which would be very difficult to explain in terms of purely conscious meanings, though it may be taught to children.

The discussion of unconsicous meanings is not limited to explaining the abnormal. There is no dividing line at which the normal ends and the abnormal begins; no fixed point at which unconscious meanings begin to operate. The unconscious is to be viewed not so much as a region of meanings sharply cut off from the conscious by an unbridgable gulf of dissociation or repression, but as an extension of the conscious in directions at once disguised and hidden from apprehension by various mechanisms, but also functionally connected with conscious meanings in many ways.

It is not easy to understand the ambivalent attitudes adopted to killing and eating rabbits unless we bring in the idea of the unconscious. All explanations must take account of individual differences, but it is likely that to many people the fear of killing a rabbit is unconsciously allied to that of murder It may be consciously tolerable if excused by the need to exterminate vermin, especially if the object exciting guilt is quickly buried or put out of sight, but to eat the dead animal accentuates the guilt. Thus one man normally able to eat meat, though with slight reluctance, was unable to eat rabbit at all because it was "anatomical." By this he meant that its limbs were like human limbs, whereas mince or sliced mutton had no such prominent resemblance to the human anatomy. Many melancholic patients carry this fear to the extreme of a psychotic symptom, and cannot eat meat at all because it is like eating human flesh. If the rabbit killed and eaten was known to be with young, the guilt would be redoubled, and the fears would be greatly amplified and made more complex. The fecundity of a buck rabbit is less obvious, and the possibilities of the destruction of life are less closely linked with its death. These unconscious ideas are closely related, on the conscious level, with the need to avoid exterminating animals of food value, or which are good for sport, and hence find normal expression in the practice of the closed season for game. So it is possible to be rationally "practical-minded" on the conscious level, and for this reasonable surface to be based on deep unconscious needs which are neither "practical" nor rational. This is the sort of way in which the unconscious is related to ordinary life.

The fear of toilet paper referred to above is a projection of the idea of dirtiness upon the paper, rationalised and justified by the idea that other people may have handled it. There is a double projection of the fear of being dirty, first upon the paper itself and then upon other people. By the ritual of the private paper this fear is neutralised, but it is likely that more and more elaborations of ritual will be required as time goes on, because none is fully satisfying or fully dispels the lurking fear of dirtiness, and, in the end, in some persons, an obsessional neurosis might be reached. The washing ritual and the ritual of medicated soap have similar explanations, which, like the fear of eating doe rabbits while breeding, call for the conception of unconscious meanings The unconscious fears of dirtiness find a satisfactory expression in most people in the use of disinfectants and similar precautions of modern medicine, many of which simply exploit the irrational anxiety of the public and some of which are actually necessary. In this way such fears are related to ordinary conscious life

Another interesting example of the way unconscious meanings demand attention might be given In Rossetti's famous painting, *The Annunciation,* we see a figure who is a likeness of his sister, Christina, sitting on a bed dressed in a white garment, while a male figure, also in white, holds out a lily to her. For the male figure, the Archangel, his brother, W M Rossetti, and at least two other models as well as his friend Thomas Woolner, the sculptor, who was a fellow member of the Preraphaelite Brotherhood, appear to have posed. Another woman, Miss Love, also posed for the Virgin, but the head is considered a likeness of Christina (20, p 160) It has been said that "the poetic nature of the artist finds exquisite expression in his haunting conception of wistful, meditative maidenhood" (15, p. 260), but it is difficult to escape the impression that the woman is terrified of the lily. A remarkable feature of this work is the dead lily upside down, hanging as if embroidered on velvet, to the right of the picture. The lily theme may be seen without many of the double meanings presented here, in Rossetti's much later painting, *The Beloved,* which is essentially the same in fundamental meaning, and is sensuous to the high degree of which this artist was so capable. For this work the three principal heads were all painted from different models, the central one from a woman probably called Mackenzie, that on the spectator's right from a gipsy called Keomi, and that on the left from Ellen Smith (20, pp. 242 ff). At this time Mrs William Morris might be regarded as Rossetti's most inspiring type of female beauty, although *The Beloved* was painted during the interval of years when she did not sit for him. It would be easy, however, to think of the painting as showing her, rather than individual models, no less than five times together, once with golden, once with black, and three times with auburn hair. In this way several different emotional aspects of the fantasy figure are separated and presented side by side. There are again two lilies, but not at all dead in appearance, and they are scarlet instead of being white. A sad-looking nigger boy holds up a golden vase of roses in the foreground

In *The Annunciation* we are faced with a spiritualised and transformed Oedipus theme The painter's friend, Thomas Woolner, combines with his brother and other substitutes to displace Rossetti himself, his sister and Miss Love displace his mother The lily is a phallic object disguised as a token of the love of God The coldness annuls in consciousness the great emotional warmth of this theme in the unconscious. The dead lily, presented side by side with the living one, denies in the very act the deeper meaning of the painting. The expression of the woman reflects the horror which the unconscious theme excites in consciousness; at the same time it points the meaning even more sharply. The whole painting is made publicly acceptable as a representation of the myth of the Annunciation, of which the complex meanings need not be analysed here. All this does not in any way tell us that Rossetti's painting is less than a masterpiece. Few artists could have produced so great a work as their second exhibited oil painting. In *The Beloved* we see Rossetti's work when he had lost the superficial effects of the frustrations which made *The Annunciation* so ambivalent. The unconscious meanings call for less disguise. His impulses have transferred themselves to Mrs. Morris and to remoter objects. The same essential theme is decked out in terms of sensuous imagery, and, while the female figure is presented in multiple form, the male figure has been converted into an innocent-looking black boy. It is now as if the artist, still feeling the need to justify the unconscious theme, presents it in a gay, emphatic, and innocent way, instead of denying its emotional warmth by the coldness of the picture He now displaces interest upon many females, multiplied both in the painting itself and in the models chosen, whereas before there were only two females condensed into one image, and he himself was disguised in the combined shape of many male persons.

It seems that MacCurdy's theory of patterns of meaning, and his idea that the study of meaning is the study of associated reactions, are likely to be more helpful than Bartlett's treatment, though the idea of meaning as relationship of situation to active tendency might be effectively extended to include the problems discussed. The central point at the present stage is the difficulty of using any terminology which confines meaning to conscious relationships, and expects us to say either that meaning does not exist outside consciousness, or to substitute other terms such as MacCurdy's "significance" for unconscious meanings. It is easier to speak of meanings as conscious or unconscious as required.

H. MEANING IN GENERAL

Meaning tends to be lacking where incoming sensory impressions, perceptions, ideas, impulses, and tendencies are in confused and disorganised relationships. It is gained wherever these relationships resolve themselves, by any means of analysis, synthesis, rhythmical patterning, perceiving, imaging, symbolical formulation, rationalisation, or other activity, into organised and harmonised units, schemes, or systematised wholes This harmonisation may give rise to true or false objective apprehension, to systematised or fragmentary fantasy; to true conceptual knowledge; to unification of aim, will, and interest; to the development of personality stabilised on a profound or a superficial basis; or to any other organised product of which the reader may be able to think; but the result will be a gain in meaningfulness of responses, in the widest sense of the term response.

The important problem is not that of saying where meaning is absent and where and how it begins to exist. It is relatively lacking where there is a lack of harmoniously developed mental functions, and the more harmoniously these relationships are developed, the greater the degree of meaning. In the relative absence of meaning it is difficult or perhaps impossible for appropriate response to take place, either with respect to subjective or to physiological states and tendencies, or to the outside conditions of that response Either or both of these internal and external environments of the potential response must be adjusted, and they must be coordinated in some way or ways before the response can occur. Thus, where meaning is present, responses may be appropriate to the internal and external conditions, and in fact, meaning is a word used to refer to the relationship between such conditions when a response appropriate to them is possible or actually does take place. We might say that meaning is the very appropriateness which explains perceiving, remembering, thinking, and acting. It might be possible to say that meaning is the very synthesis of appropriate subjective or physiological processes and of objective conditions, which makes response possible.

This is not a behaviourist treatment of meaning, but there may be more truth than Watson thought in his capricious comment that meaning does not exist. To him it seemed that reaction and meaning are identical. To us, however, it might seem that when the psychology of sensing, perceiving, imaging, remembering, thinking, willing, believing, and of all the other psychological problems has been fully dealt with, then in the very act, meaning has also been dealt with fully. This is indeed a likely proposition, because meaning is psychologically different from all the aspects of mental life just mentioned When we perceive, remember, think, or will, we also mean. It is not true, however, in the same way, that when we perceive we think, when we remember we will, or when we believe we image

It is of vital importance to avoid being misled into thinking that different component features of mental life can be separated and handled as if discrete. For science it is necessary to analyse, otherwise we could not apprehend and formulate what we try to understand. For psychological science, however, it is also necessary to be able to follow the workings of the mind, which are strongly characterised by synthesis and integration. In answering a questionnaire on motives for taking up the profession of a mole catcher, a man might be able to mention 10 or 15 coordinated influences which had been at work, but it would be fictitious to try to treat them in isolation. In fact the real motivation has been in their effective combination. This kind of analysis is necessary for science, but it must be tempered with understanding.

If we analyse mental functioning into a group of processes, like sensing, perceiving, imaging, remembering, thinking and others, we are making an analysis which is largely fictitious. The product, although a fiction, is accepted, because it helps us to understand the problems of psychology. There are no sharply defined points at which these respective mental processes end and begin, though remembering may be more prominent at one time and thinking or perceiving at another. The sense in which it is true to say that these processes are all inter-locked, is therefore that in which the mind is viewed as a whole. The sense in which meaning is fully discussed by implication, when all these processes are dealt with, is different. Meaning is a more specialized abstraction, and, by using the term we refer to and explain the appropriateness of impulse, idea, feeling, and outside object on one or other occasion on which response is possible At the same time, the problem of meaning is of great interest, when treated by itself, just like the problem of insight, which is a similar abstraction. By discussing meaning we can coordinate many related aspects of psychology and formulate a clear and more unified picture. So the discussion of meaning must find a place in the list of psychological topics

There is, perhaps, more difficulty in thinking of meaning as present at the physiological level, before consciousness has appeared in evolution, than there is in thinking of unconscious meanings, of which the consciousness has been repressed or dissociated In the physiological meanings or reactive significances, as Bartlett has called them, the essentials of meaning are present, if considered objectively. It is the prerogative of psychology to be a subjective science which makes the difficulty This prerogative cannot be ignored without doing violence to the subject-matter of psychology, which deals with experience as well as with behaviour. If consciousness were not taken into account, the difference between reactive significance and conscious meaning would still be found It would lie in the precise, analytic, and complex nature of the cross currents of relationship in higher mental responses, as contrasted with the cumulative, linear, and simply temporal relations in schematic organisation If, as Bartlett suggests, there is a step of fundamental importance, in which the organism turns round upon its own schemata and becomes conscious, then neither objective experiment nor introspective analysis has revealed the exact place at which that step is taken, and Bartlett's experiments do not reveal it. Consciousness must have emerged by infinitessimal stages into its known complexity, and we cannot find its beginning Bartlett's essential idea of the function of consciousness in splitting up the schemata into conscious and meaningful relationships may be true, but it may still be true that the search for the origin of consciousness leads to a *regressus ad infinitum*. The more fully consciousness is developed, the more completely meaning is contrasted with reactive significance, but this contrast itself is not easy to make How do we know that the alimentary canal is not in the least degree conscious; or that there is no independent consciousness of the most elementary kind in the parts of the central nervous system which may function in balancing a man standing upright while he is fast asleep? It must be supposed that consciousness emerges in infinitessimal degrees in many different functions, and is ultimately welded into the fully developed feelings and into the analytic and synthetic thought.

I CONCLUSION

In view of these ideas it seems that the modes of meaning which underly the workings of schemata in the vigilant nervous system are to be related to the conception of meaning as interest, and that in turn to the pattern theory and to the idea that meaning lies in the connection of objective and subjective determining conditions which define a psychological situation In nonsense we are dealing with special and unexpected or unintended meanings The idea of unconscious meanings is closely related to all these other notions of meaning. Whenever the nervous system is in a vigilant state and organised schemata are determining appropriate responses, we have the physiological parallel of developed conscious interests and the grouping of impressions, ideas, and impulses which throw the environment into light and shade significant for action and thought. Whenever any such conditions as these are present we can analyse out patterns of past and present response which issue in the expression of meaning, either in terms of feeling and emotion, of direct adapted behaviour or of thought, knowledge, and theory. Whenever organised patterns of response are to be found, we have the essential condition of the psychological situation which leads on to further response and to constructive activity. The unconscious is a hypothesis to account for the existence of a vast range of meaningful patterns, interests, and situations, which cannot be singled out in attentive thought by the person who responds, and are generally denied by the ego at the time though they seem to an objective observer to be at work. In all these ways, it seems that Head, Drever, MacCurdy, and Bartlett, together with the psychoanalytic writers, have been advancing an essentially related scheme for the formulation of meaning in psychology.

In the most generalised way we may say that where meaning is to a large extent lacking, it is difficult or impossible for a response to take place, which is appropriate to subjective states and tendencies, to physiological conditions, and also to the objective circumstances of reaction. Harmonisation and adjustment of these various conditions to each other must take place before a response can occur, and it is then meaningful because it is appropriate. The word meaning may be used to refer to the appropriateness of all conditions when adapted response is possible or does occur. The expression of meaning may take the form of predominantly affective or emotional, of behavioural or of thoughtful response. It is often convenient, as Bartlett has pointed out, to speak of an "effort after meaning" This effort is found where the organisation of psychological tendencies and material and their relations to the objective environment are not such as to promote appropriate response, and where secondary tendencies of a harmonising order are set up. This again emphasises that meaning lies in the appropriateness of all the subjective and objective conditions of response, and that effective response may be delayed while meaning develops. The effort after meaning is characteristic of many psychological reactions, and may be demonstrated by simple experiments (16). However we look on it, the idea of meaning is a psychological abstraction, and it is necessary to guard against the risk of treating it as if it were a discrete entity.

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AN EXPERIMENT ON THE IDENTIFICATION OF BODY ODOR*

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A. THE PROBLEM

In any discussion of racial or intercultural relations, almost inevitably some one raises the issue of body odor. Whether the discussion be among housewives, students, or university scholars,[1] eventually some one argues that certain peoples have distinctive body odor, and that odor is the reason given for insisting on social distance.

Recently a housekeeper said to the author that she did not wish Negroes to live in the same residential area with her, "because they smell" She does not want Negroes to live next door, but she has no objection to their working in intimate relations *for* her in her home If odor makes them undesirable neighbors, it makes Negroes even less desirable servants, but those who insist on residential segregation rarely object to having as servants those who are not good enough to be neighbors.

Although body odor is often given as the reason for discrimination, aversion, and segregation, there has been more theorizing than scientific investigation on the topic. According to Klineberg (3).

> A great deal was written during the Middle Ages about a specific Jewish odor. Fortunatus was entirely convinced of its existence, but believed it could be removed by baptism Schopenhauer also believed that the Jews had a special odor Recently this notion has been revived, particularly by Gunther . . , who studied the odor supposedly characteristic of Jews by eating in a Jewish resaurant It is hardly necessary to point out that this would give him only the odor of Jewish food, and that it cannot be considered a scientific way of studying the odor of Jews themselves.
>
> The characteristic body odor appears to come mostly from the skin secretions, that is to say, from the sweat glands, particularly in the re-

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[1] An example of a university scholar's statement is L. Cole's flat assertion in her *Adolescent Psychology* that "The most outstanding or racial differences are physical—skin color, type, color and distribution of hair, shape of face and head, and shape of nose and lips, and *body odor*" (2) (Italics are mine). Cole does not argue that any group has a more offensive odor than another, or that these differences justify discrimination, but unquestionably, in the minds of many, the net effect of her statement is to justify segregation practices that do exist

> gions where there is hair, and it is therefore much more noticeable after the body has been perspiring freely and before it has been washed. Hooton . . . asked a Japanese student at Harvard whether he detected any odor as a distinguishing feature of whites. The reply was that he did most decidedly, and found it very unpleasant He went on to say, however, that it was particularly disagreeable whenever he entered the Harvard gymnasium. Since Hooton had himself noticed it under these same conditions, this could hardly be regarded as an indication of peculiar racial odor.[2]
>
> An experimental attempt to throw a little further light on this question was made in an unpublished study by Lawrence, who collected in test tubes a little of the perspiration of White and Colored students who had just been exercising violently in the gymnasium. These tests tubes were then given to a number of White subjects with instructions to rank them in order of pleasantness. The results showed no consistent preference for the White samples, the test tube considered the most pleasant and the one considered the most unpleasant were both taken from Whites.

This is the only experiment on body odor reported by Klineberg, and as he pointed out, the original was not published in any psychological or professional journal. One reason for the dearth of experimental work has become clearer as the following experiment progressed, though the author's attempt to find out whether Negroes have a body odor that others are able to distinguish was not motivated so much by abstract intellectual curiosity as by an immediate need to answer more adequately a student's insistent contention in a psychology class.

During the 1949 winter term in social psychology at Springfield College, a student asserted that there was a distinct difference between Negroes and whites in regard to body odor. The instructor admitted the possibility, and he related Gilbert Murray's story of a Japanese girl "who fainted at the smell of a number of Europeans and Americans sitting at dinner" (4). The odor of whites was so suffocating that the girl was overcome. If there are differences in odor, perhaps the differences are not in favor of whites. However, the instructor declared that he believed that if diet, occupation, opportunity for cleanliness were equated, there would be no significant differences in odor between racial or ethnic groups. The student who originally raised the issue insisted that there would still be a difference, and the instructor promised to deal with the problem further at the next period.

At the following session, the Allport-Postman (1) rumor experiment was performed After the fourth verbal repetition of the scene in the subway in which a white man, holding a razor, was talking to a Negro, the razor shifted from the white man to the Negro's hand. There was a razor in the picture. That was true, but the razor was in the white man's hand. That is about as much truth as there is in many opinions about minorities. Perhaps that is as much truth as there is in the popular view about the odor of minorities. The experiment effectively demonstrated how many views about Negroes and minorities in general were more a reflection on the majority than the minority. The instructor pointed out that if Negroes had any peculiar body odor that whites noticed, it was probably due to whites looking for that odor. Nevertheless, this conclusion was a theory and he suggested an experimental approach that would test the ability of whites to make the distinctions they claimed.

---

[2] This *can* be an indication of a peculiar racial odor—of whites

Four students volunteered to help carry out such an experiment, and they enlisted the aid of two Negro students All were members of the Junior class. Although the planning was done with the instructor, the actual work was carried through by the following students: James Green, F. Ray Finley, Donald MacMillan, Charles Pead, LaForest Smith, and Wilbur Thompson

B. PROCEDURE

1 Four students who served as the objects for the odor differentiation are called the experimental subjects. Two were white and two were Negro. The students eat in the same cafeteria, live in approximately the same quarters, were brought up in approximately the same economic level, and participate in the same school activities.

2. To assure further control at the time of the experiment, the four students took a shower in the same shower room and all used Ivory soap. Each student was supplied with a towel and identical gymnastic clothing, freshly laundered at a common cleaners and obtained from the school equipment-room untouched by any outside person.[3]

3. Since the clothing supply was of sufficient size to cover all parts of the body but the head and hands, clean sheets, also cleaned at the same laundry and obtained from the same source, were used to cover the head and hands.

4. During the making of the judgments, the experimenters were careful to see that each judgment ballot (see next page) was filled out in complete privacy before those who made the odor judgments (called the subjects) could converse with any others. This was a caution against the possibility of the subjects getting together after they had attempted to identify the four covered students and comparing notes and possibly making a group decision rather than an individual decision.

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[3] We are indebted to Dr. Arthur Esslinger, director of physical education, for providing this equipment

5. In the second half of the experiment each of the four experimental subjects exercised exactly 15 minutes.

6. No smoking was allowed in the experimental room.

7. The subjects entered the room one at a time and were spaced far enough apart to eliminate any distortion in the results of the experiment as a result of the body and clothing odor of the subjects.

8 No one was required to give his name on the ballot. This was to *eliminate the possibility of the subjects marking their ballots according to* the way they believed they should under social pressure.

The experiment was divided into two parts, viz., "before exercise" and "after exercise." Each of these divisions was further divided into three parts· (*a*) two Negroes, (*b*) two whites, (*c*) one Negro and one white. Each time the order differed in order to avoid repetition of pattern. A separate room for the experiment was used adjoining a waiting room where the subjects were asked to remain until their turn.

In the experimental room two chairs were placed as far apart as possible. Two experimental subjects were seated in the chairs with their legs straddling the backs and their head bowed on the back Their heads were then covered with the sheets, and their hands were kept under the sheets. After the experimenters checked each student to see that there were no visible ways of determining which was white and which Negro, the subjects were allowed to enter the experimental room one at a time and well-spaced. As the subjects passed by each chair they were allowed to smell any part of the body. This process was repeated six times, the combination of Negroes and whites having been changed each time. The first three times, the experimental subjects were fresh from a shower and were not perspiring. The second three times through the experimental room, the experimental subjects had exercised vigorously for 15 minutes and were perspiring profusely.

Upon entrance into the experimental room, the subjects were given a ballot on which to record their decisions. Upon leaving the room, the ballots were collected by the experimenters in the order that the subjects passed through. Since the subjects were not required to sign their names to the ballots, it was necessary to give each person a number in order for him to receive his own ballot each of the six times through the experimental room. At the beginning of each succeeding part, the ballots were redistributed according to the numbers given each individual.

The subjects were asked to record their decisions on the ballot according to a simple letter code. Over each chair was placed a letter "*X*" or "*Y*" The letters were changed after each part of the experiment. The subjects were merely asked to write in the word, "white" or "Negro" on the line provided corresponding to the letter which identified the particular chair in question.

The subjects were members of a young people's group at the Faith Congregation Church in Springfield, Mass., and members of the class in social psychology in which the issue was raised.

C RESULTS

In Tables 1 and 2, the results of the two sessions are summarized.

TABLE 1

Situation			Correct	Incorrect	Don't know
			BEFORE EXERCISE		
1	X Y	White Negro	21	15	31
2	X Y	Negro Negro	12	29	28
3.	X Y	White White	26	9	32
		Total	59	53	91
			AFTER EXERCISE		
4	X Y	White White	29	11	26
5	X Y	White Negro	25	11	32
6.	X Y	Negro Negro	8	20	38
		Total	62	42	96
		Grand Total	121	95	187

Place Faith Congregation Church
Time: 9·30 P M., Feb 6, 1949.
Average age, 21.96.
Median age, 19.5.
Oldest, 50
Youngest, 17.
Sex, 9 males, 24 females

D. CONCLUSIONS AND DISCUSSION

The answers of four individuals who did not complete the experiment have not been included in any of the totals. Of the four, one came from Georgia and one from Virginia. The stated reason for three leaving before completing the experiment was the need to catch a bus to a distant neighborhood. In view of the lateness of the hour, the stated reason is probably the real one. The fourth had a cold and after several trials was excused.

TABLE 2

		Situation	Correct	Incorrect	Don't know
		BEFORE EXERCISE			
1.	X Y	Negro White	15	10	27
2.	X Y	White White	13	9	30
3.	X Y	Negro Negro	8	12	32
		Total	36	31	89
		AFTER EXERCISE			
4.	X Y	White White	12	10	30
5	X Y	Negro Negro	11	11	30
6.	X Y	White Negro	10	10	32
		Total	33	31	92
		Grand total	69	62	181
		Totals for the two groups	190	157	368
			190	525	

Place: Springfield College, social psychology class
Time: 6:00 P.M., Feb. 8, 1949.
Average age, 24.5.
Oldest, 44.
Youngest, 18.
Number of subjects and sex, 26 males

Except for a few individuals, the group was composed of those who had lived all their lives in New England or above the Mason Dixon Line; therefore no conclusions could be drawn about the difference in abilities, expectations, or confidence of Northerners and Southerners in making judgments.

Thirty-eight indicated by their answers that they believed they could differentiate between the odor of the experimental subjects. The remaining 21 consistently answered with question marks. Of these, one had some Southern background. We have no quantitative data to account for the consistent "don't know" answers, but comments made by some of the subjects indicated that they started with the belief that it was silly to think there were innate differences in body odor. Not expecting any, it would seem that they did not note any. However, since the information on this point is inadequate, the hypothesis needs to be tested further before any conclusion can be drawn with confidence.

Incorrect judgments and "don't knows" both signify inability to make correct differentiations These two groups, therefore, have been totalled together in comparing them with the correct judgments. The number of correct judgments of both the church and the college groups was 190; the number incorrect, 157; "don't knows," 368—or 190 correct to 525 incorrect and "don't know."

If the choices of the three categories were made by chance alone, the expected frequency of each would be 238.33 as contrasted to the obtained frequencies of 190 correct;[4] 157 incorrect, and 368 for "don't know." On the other hand, if the incorrect and "don't knows" are grouped together, since they both represent inability to make correct judgments, the expected frequency on the basis of chance would be 357.5 for the two categories as contrasted to the obtained frequencies of 190 and 525 respectively. However, this is mass data, and Tables 3 and 4 give the individual scores.

TABLE 3

1	33% correct	
2.	66	
3.	33	
4.	66	
5.	50	
6.	66	range 33%—66%
7.	50	mean 52%

Seven individuals gave no "don't know" answers. By making differentiating judgments each time, they indicated confidence that they could and did differentiate the body odor. The scores for the seven are given in Table 3.

Thirty-one individuals gave both differentiating and "don't know" judgments. Their scores are given in Table 4.

Of these 31 cases, 20 individuals made 41 "don't know" answers where Negroes and whites were paired. They could not come to any conclusion about identifying odor when both Negro and white subjects were to be identified. Twenty-one could come to no conclusion about odor at any time. Seven indicated that they could make a differentiation every time, and 31 made mixed responses, but in no case were there more than 66 per cent accurate responses, and the lowest score was 8 per cent There is no doubt that neither the mass nor individual data support the theory that Negroes have a distinctive body odor that whites can identify.

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[4] Those who made correct judgments, in every case also made incorrect judgments If there is such a thing as distinctive racial odor that can be noted, wouldn't it be discerned in every instance since the subjects were looking for it? Because the usual frequency analysis would obscure this fact, none is made here

TABLE 4

1	33% correct	
2	33%	
3.	42	
4	33	
5	25	
6	42	
7.	66	
8.	33	
9.	33	
10	08	
11.	42	
12.	08	
13.	33	
14.	33	
15.	42	
16.	42	
17.	50	
18.	33	
19	50	
20.	25	
21.	42	
22.	33	
23.	08	
24.	50	
25	66	
26.	25	
27	50	
28.	58	
29.	33	
30.	42	range 8—66%
31.	33	mean 36.97%

Our experiment neither proves nor disproves that there are "racial" differences in body odor, but if such differences do exist, and whites and Negroes are equated for diet, cleanliness, and the like, our evidence very definitely does not support the view that whites can *identify* that odor with any dependable degree of accuracy.

To the statistically-minded, our evidence may seem too slight to draw such definite conclusions, but such an objection is not relevant to this experiment. If a peculiar odor is a racial characteristic that can be noted, it exists in every individual of any given group and can be accordingly identified. If it does not exist in a single member of that group or cannot be identified with complete accuracy, it cannot be considered racial. No further statistical analysis is pertinent because of the very nature of the claim that is made about odor. For logical proof, no larger sample of Negro experimental subjects is needed, but for educational effectiveness more groups to do the differentiating were planned for and needed. Unfortunately the experiment was too offensive to continue further. The time required of volunteer groups was excessive. The first series required three hours to complete, and the second, two hours. It was believed important to perform this experiment with groups to help them see for themselves whether they could with accuracy differentiate between Negroes and whites. The Lawrence experiment is more convenient and less offensive, but at the same time less real. An assumption underlying this project is that an experiment with real people is more effective in bringing the facts home to individuals, but we did not reach as many people as we wanted to.

An example of the difficulty encountered with a non-campus group is illustrated by a protest made by a colleague who attended the meeting of the church young people "What will the parents think when these nice girls tell them that Springfield College boys had them smell colored and white boys?" he complained to the college president He believed that the experiment involved bad public relations, and perhaps it did.

To ask Negroes or whites to undergo the humiliation of being smelled by a variety of people cannot be lightly done. To ask others to sniff at whites and Negroes stretches the limits of what can be expected from volunteers. Perhaps those who so glibly assert that certain peoples smell ought to be required to be subjected to the indignity of such an experiment. Then they might be more restrained in their cruel opinions.

E. SUMMARY

Fifty-nine subjects made differentiating judgments of the body odor of two whites and two Negroes. During the first half of the experiment, the four boys had just come from a shower; during the second, they were perspiring profusely from 15 minutes of vigorous exercise. The overwhelming majority of the subjects were unable to tell any difference in body odor or they made incorrect judgments.

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INSTRUCTION TIME IN CERTAIN MULTIPLE CHOICE TESTS: CASES XCVI-CII*

The Grant Study, Department of Hygiene, Harvard University

F. L. WELLS

Regular procedure with a number of tests used clinically in the present setting, has been to have the examinee study the test instructions in printed form, signifying when he is ready to begin the actual work. At various periods it has been a further practise to record the time elapsing between beginning to study the test instructions, and signifying this readiness to start. Here is presented a brief review of these observations, including some relationships to performance in the test itself.[1]

The functions observed were principally, Alpha subtests (verbal): Same-Opposites, Directions, Mixed Sentences; (number): Reasoning, Addition, Highest Common Factor (6). Also, adapted subtests from the Differential Aptitude Test (1): Verbal Reasoning, Numerical Ability, Mechanical Reasoning, Space Relations, Abstract Reasoning. In Table 3 these DAT Subtests are denoted respectively by V, N, M, S, A. For correlations among the Alpha functions, N=200 for a Hygiene Department referral series, 124 for a Grant Study series. The DAT material consists of two smaller series, one of originally odd-numbered items (N=32), the other of even-numbered items (N=33).

Among instruction times, the larger figure naturally denotes a slower (poorer) accomplishment. In these test scores, the larger figure denotes a greater (better) accomplishment. The (normally) negative *r* observed between these two variables denotes accordingly, an expected association of shorter instruction time with higher test score.

There is a trend for this relationship to be more pronounced for the verbal alpha subtests (B, C, G) than for the number (A, E, F), but it is slight. The *r*'s are as in Table 1. One might look for a greater association in the (normal) Grant Study material than in the referrals, but this does not appear.

The Alpha test instruction time ranges in mean length from about 16 seconds (Same-Opposites, Arithmetical Reasoning) to 54 seconds (Highest Common Factor); *SD*'s average about 50 per cent of their means. There is

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[1] The present statistical computations are the work of Miss Dorothy Fritz of the office staff.

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TABLE 1
CORRELATIONS OF TEST SCORES IN ALPHA SUBTESTS WITH THEIR INSTRUCTION TIMES

Subtest	Grant Study ($N = 124$)	Hygiene Department ($N = 200$)
B (Same-Opposites)	— 32	—.30
C (Directions)	—.16	— 34
G (Mixed Sentences)	— 34	—.23
A (Arithmetical Reasoning)	—.24	— 27
E (Addition)	— 07	— 13
F (Highest Common Factor)	— 10	— 24

in the Grant Study group a trend toward lower *SD*'s for both instruction times and test scores

There presents itself the question if the instruction times are more associated with each other than with their subtest scores. This is somewhat the case. Thus all *r*'s for Highest Common Factor (Subtest F) instruction time against other instruction times are over 40, except in the Grant Study material for the very brief instruction times to Arithmetical Reasoning (A); with this latter subtest, the lowest *r*'s in this material are generally associated. Relatively high instruction time *r*'s are for subtest Highest Common Factor (F) against Mixed Sentences (G), in both Hygiene Department ($r = 66 \pm .03$ *PE*) and Grant Study ($r = .51 \pm .05$) groups. These instruction times have much the longest means of the subtests involved. Details are as in Table 2.

TABLE 2
INTERCORRELATIONS OF INSTRUCTION TIMES FOR VARIOUS ALPHA SUBTESTS

	Grant Study ($N = 124$)						Hygiene Department ($N = 200$)				
	F	E	A	G	C		F	E	A	G	C
E	49					E	.47				
A	24	.44				A	.41	33			
G	.51	42	33			G	.66	.50	.49		
C	.47	.36	25	.38		C	.50	.57	34	50	
B	.48	.39	31	.37	.41	B	45	51	41	48	54

As above mentioned, *SD*'s for the present instruction times average about 50 per cent of their means A corollary of this marked spread is that when we speak of language multiple choice tests (like the Alpha) as "reading tests," we mean reading of a rather specific sort, *whereas the reading of test* instructions is a function of more variables, into which "personality" factors may enter largely (impulsiveness, compulsiveness).

In the DAT material there appeared a considerable difference between odd and even items *in the Space Relations subtest means (seemingly due to the* way in which the correct answers happen to be distributed); for other subtests these are practically equal Correlations with test scores are unclear, and it may also be remarked that of the DAT subtests involved, only Verbal Reasoning and Numerical Ability can with any justice be called "reading tests." For neither odd or even items is their association of instruction time with test score especially higher than for the other subtests.

Somewhat higher *r*'s than between the Alpha instructions are found between the instruction times for the DAT subtests. A greater reliability of measurement, consequent on the greater length of the instructions, apparently offsets the smallness of the arrays. Those for the even items tend higher than those for the odd, and are less erratic, ranging from 38± 11 to 68±.07 for the even, against 23±.12 to 85± 03 for the odd The imperfect nature of these associations attests the many different things that "reading" can mean, and does. Details are as in Table 3.

TABLE 3
INTERCORRELATION OF INSTRUCTION TIMES FOR VARIOUS DAT SUBTESTS

	Odd (N=32)					Even (N=33)			
	A	S	M	N		A	S	M	N
S	.37				S	55			
M	50	85			M	48	64		
N	.51	.60	50		N	.68	63	68	
V	.25	.25	.23	43	V	48	43	38	56

A few data are available on instruction times for subtests in a Thurstone (2) Primary Mental Abilities series. N's are small, ranging from 18 for Cards to 32 for Number Series. For the subtests Completion, Cards, Letter Grouping, Number Patterns, the percentage which *SD* is of the mean instruction time varies only between 33 and 36. The smallest ratio is shown by Mechanical Movements, 29, the largest by Number Series, 41, but it is difficult to relate these differences to anything in the test instructions themselves. In this group, instruction times naturally average somewhat shorter than the standard allowance. For Completion, a verbal test, this mean was barely half as long, for Mechanical Movements, the mean was about fourfifths the standard allowance. This is understandable in a group somewhat selected for verbalization.

Brief scrutiny is now given to individual cases occupying extreme positions with respect to this assimilation of test instructions In the Alpha tests, a pattern of long instruction times is not clear cut, extreme positions being reached by hardly more than two subtests Two such cases, from the Grant Study group, have already been reviewed from other standpoints, II (3) and XVIII (4).

Case II may be recalled as selected for comparative effectiveness in dealing with verbal material. The present function is the only weakness in that area that is turned up. In no instance is the instruction time up to the current mean; for Subtests C and F it is over two sigma long. Slow "reading comprehension" is pretty well excluded as a factor. Neither is there evidence of any compulsive component in the personality, that would contribute to such a result. The best available suggestion seems to lie in the "flexible" nature of this man's intellectual processes as he describes them, which makes him react negatively to precise formulation, such as characterizes especially the instructions for Subtests C and F.

In Case XVIII Subtests G, E, and F have instruction times over 2 sigma long, and only that for A is shorter than mean. The explanation seems more direct than in II. Marginal or lower scores are recorded for vocabulary and SAT, denoting almost a language disability of sorts, with the cultural factor problematical (cf. 4, p. 128). This situation is very different from that of II, and points up the differential meanings of the findings here under consideration. For II the source can hardly be intellectual; for XVIII it is probably so.

With respect to short instruction times the situation is clearer. From this standpoint may be offered three extreme cases from among Hygiene Department referrals, and one from the Grant Study material.

In the first of the Hygiene Department cases, all instruction times concerned are clearly faster than current mean, four of the six over a sigma faster. The case shows a generalized verbal ability; SAT is at least 1.5 sigma high, verbal alpha at least 1.25 sigma high, vocabulary at least .75 sigma high. This case is thus the reverse of XVIII, and presents no such disjunctions as does II.

The second case appears very similar. SAT, Thurstone PMA Completion and Same-Opposites, are all at least 1.5 sigma high. Verbal alpha at least 1.25 sigma high; Vocabulary at least .75 sigma high. A special facility with visual-verbal instructions is thus to be anticipated.

The third Hygiene Department case is the only one so far to have presented psychiatric symptoms (psychoneurotic, psychometrically of problematical relevance). The alpha test situation is similar to the two previous, and the instruction-times perhaps the shortest of all. The test picture is complicated by marginal scores in Thurstone PMA Letter Grouping, and Zyve Exercise K. Projective responses, as in (Condensed) Rorschach, word-association, "Circles" (5), were distinguished for formal facility and flatness of content. Indications of "absorptive" rather than "creative" intellect.

In the above five cases, when instruction times were very fast, test scores were likewise very high. If instruction times were slow, the test picture at least *could* be very good (Case II).

Case XCVI. This is a Grant Study participant whose place in the present discussion derives from outstandingly short instruction times, even for the high test scores with which they are associated. Antecedents show considerable cultural and intellectual interests, socio-economic status is upper middle. Father described as "somewhat nervous," overreacting to stress, this man's childhood and adolescence however, appear singularly free from psychic traumata. The Project's physical examination reports less than average "symptoms to stress," though a very rapid pulse was observed. Linearity 12.0, endomorphic rather than mesomorphic, somatotype 4-3-1 on five-point scale. Consistently, described in college as "fond of clubs and organizations," where several officerships, with slight athletic participation. Note is made of over-speeded handwriting, with marked sacrifice of legibility.

The psychometric pattern is fairly characteristic of the over-short instruction times already noted; SAT at least 1.5 sigma high, MAT lower, not far from local average, verbal alpha similar to SAT, number alpha somewhat higher than MAT. Vocabulary not over a sigma high. As in the previous case, evidence for absorptive rather than creative intellect in a Rorschach response of only moderate richness, fair M, no C. Easy block assemblies, essentially manual dexterity, are extremely rapid, 1.7 sigma high, contrasting with the difficult, nearly 1 sigma low. Bernreuter scores denote comparative absence of (N)euroticism, a high degree of (S)elf-sufficiency, very low (I)ntroversion, and high (D)ominance. The (C)onfidence score is very good, the (S)ociability score somewhat on the asocial side. He had been assigned "Asocial" as one of the Outstanding Traits, but this is hard to reconcile with the type of social life above mentioned. A later estimate is that this rating was assigned on the basis of not "needing" social contacts, cf. Bernreuter self-sufficiency above.

Academic record was very high, emphasizing verbal subjects. Subsequently however, did very well in graduate work of a scientific professional character, having little dependence on verbalism. Handwriting continues of very low legibility. Regrettably, he is not among the group with graphological analyses. Notable features, however, are rapidity, as above noted, disconnected letters, simplified *r* and *g*, with tendency to dashing of i-dots, a complex thought to reflect a pressure of activity that should also manifest itself in these shortened instruction times. In general, one could expect in this man a superior capacity for fine intellectual discriminations, with a low threshold of reaction to them. So far, this is borne out by the type of career entered, and the good success therein

Turning now to the DAT material, where the instruction times give a more valid picture of the function involved, there were selected from a scanning of the data, two cases outstanding for brief instruction times, and two for long instruction times, and two others where the disjunction of instruction and performance was of interest. These, which are referral cases, are now reviewed for possible implications of their extreme positions in the present respect.

Case XCVII. This man offers no problem of an overtly psychiatric nature; is puzzled in regard to aptitudes for natural and social science courses, later vocational objectives; referred whatever light tests may throw on these questions. From the present standpoint he presents DAT instruction times very long as such, markedly below test scores attaching thereto.

Economic circumstances are comfortable, and there has been a fairly active extra-curricular life. Some rather exacting business activity before present college attendance Entrance medical examination rates him above local average in personal qualities generally, except that lower ratings are given on motivational aspects, consistent with his seeking this counsel on organization of academic life and later career. Linearity 12.1.

Entrance tests generally of low level, SAT —1.08, MAT —1.36. Here, speed alphas are better, verbal only —.32, number —.54. DAT scores range from —.82 for Verbal Reasoning to +.48 for Abstract Reasoning, illustrating what the clinician soon learns who deals with various types of abstracting tests, that they are considerably modified by the area in which the abstraction is taking place. The sigma disparities between instruction times and test scores are for Verbal Reasoning .25, for Numerical Ability 1.99, for Mechanical Reasoning 2.24; for Space Relations 1.25, and for Abstract Reasoning actually 4.11 Much the longest instruction time was thus taken for the test in which much the best score was made As a whole, these DAT test scores are better than those for SAT/MAT or alphas, also Vocabulary (—.73).

This is another of the cases where multiple choice data like the above would point to a misleading estimate of the intellect involved. A referral suggestion of "deeper conflict than appears on the surface" is associated with a Rorschach pattern "as heavily loaded with Abstractions as any recalled," also with the accessory verbiage and elaborative detail which are thought to be associated with anxiety Color is much subordinated to Movement, while there is considerable shading and texture (no "vista"). Response number is well over a sigma high, and the general richness is well above local average. Meeting

Imagined Situations (the "Imagination" test of 7, p. 371) was also very well performed.

As is frequent, there is no aptitude differentiation to outweigh any clear motivations if these were present; what balance there is, might be thought to favor social over natural science. The excessive instruction times look like functions of anxiety, perhaps of recent origin, since his best entrance test score was for Reading Speed, well above local average.

Case XCVIII. Here the instruction times are again very long as such, and generally with reference to test scores. There is evidence that this is involved with more serious difficulties than appear in Case XCVII. Both written academic exercises and ordinary conversation reportedly tend towards the "incoherent." "His emotions seemed to have little relation to the realities of his present life."

Entrance medical examination recites middle, perhaps lower middle, economic status; athletic participation earlier fair, now much reduced, scientific work preferred, language work always difficult. Was termed an "average boy," but noteworthy that specific ratings range from the highest (Appearance and Manner) to the lowest (Aesthetic and Cultural Motivations and Life Attitudes), the latter not easy to reconcile with the same scale's better-than-average prediction for adjustment to a liberal arts curriculum.

Academic difficulties as above led to referral for psychometric light on their basis and management. When seen, there was not the spontaneous stream of conversation elsewhere observed, but there was considerable vocalizing to self, and unexplained laughter. Postures seemed strained, though this could be secondary to a considerable ectomorphy (linearity 13.6), hindering adjustment to furniture. Formal test scores were nothing to forecast academic difficulty though running clearly lower than entrance data (e.g. SAT +.74, MAT —01). Sigma disparities between the slower instruction times and the faster test scores in the DAT series are Verbal Reasoning 43; Numerical Ability 1.87, Mechanical Reasoning 1.84; Space Relations .45, Abstract Reasoning 1.98. These disparities are consistent with subclinical dissociative symptoms later described to the psychiatrist (see below); the more stressful conditions of actual test tend to set them aside.

Rorschach responses included refusals on VI and IX, disorganized response to color, unusual contents, reaction times much too long for intellectual level. Another, more elaborate but monochrome series was remarkable for small (rare) detail, including small white space details. These tendencies, save for slow reaction, were not picked up by word-associations, which were singularly "objective." Picture-story responses (written) yield fairly rich imaginative content, but again atypical, schizoid. A special feature of this function is a handwriting of very "low standard class," with mannerisms and misspellings. This contrasts with an almost copy-book style in certain entrance forms.

It was felt that this picture had implications sufficient to warrant psychiatric attention. Here he mentioned thought processes of a slightly dissociative sort, and was noted for lack of normal response to (academic) failure, "grossly inadequate emotional reaction." On the other hand appetite and sleep said to be good, and girls dated.

Academic failure led to separation, and no later data are available.

Case XCIX. The chief interest here is the mastery of English language tests by one whose native language is not English, who in later childhood came into an English-speaking environment, in which he has now been for about nine years. Parents are of very high intellectual grade, with the survivor showing evidence of similarly high personality stability. Like evidence of this man's capacity to support stress. Medical history records mostly sedentary activities, but capable of manual work. Good sleep habits. Appraised excellent for both practical and cultural life attitudes, and for prospects of college adjustment; "stable, bright, should do well." Linearity 13 2, practically average. No adjustment problem in the ordinary sense, question of referral merely to review and assess capacities for work in social sciences and linguistics.

Psychometric data may be summarized on a sigma basis as follows: SAT +1.48, MAT +1.5. Various other entrance tests of similar order, predictive rank 3, approximately (Michigan Vocabulary 91st percentile for college sophomores, relatively low areas in Biological Science and Sports) Speed alpha verbal summates to +1.66, the Same-Opposites subtest completed without error in 87 per cent of the time allowance. Speed alpha number summates to +2.29, the highest-common-factor subtest completed with one error in 58 per cent of the time allowance A Number-Checking test, given for its minimal cultural involvement, yielded the not wholly unexpected score of +1.73. Speed was prodigious, scores reduced by errors. This tendency was also observable in the alphas, and still more so in the DAT work Here the fast instruction times are merely of a piece with the rest of the picture. Sometimes they surpass the test score, as in Verbal Reasoning by .48 sigma, sometimes they are less good, as in Abstract Reasoning by 1.18 sigma. The test scores represent an inordinate sacrifice of accuracy to speed; presumably temperamental, Kempfian Anabolic balanced, Catabolic plus; there is no reason to think he made any error he did not know better than to make.

For the general issues involved, it may be best to quote substantially from the note at the time of examination:

> Between the two careers at issue, it is difficult to see a relevant distinction in terms of aptitudes. Discussing the matter with him, the nearest one could come to it was the consideration that "history" took more of an overall mind, while "philology" took more of a detail one. From a Rorschach standpoint this distinction is clear enough, the responses being heavily weighted with Wholes On the other hand the alphas and like tests show prodigious capacity for detail work when it is put up to him, though accuracy is far from perfect
>
> An underlying feature seems to be this pressure of activity which produces errors in details, and will not let him look for details when there is a chance of getting off with a "Whole" response.
>
> Consistently, the Bender Gestalt figures were very rapidly and "carelessly" drawn, though fundamental features were of course correct One may note the recorded excess of reading speed over reading comprehension score
>
> There is in these observations no justification for preferring either career over the other; . . he should do more accurate thinking than here, or be in some area where there is a good deal of "semantic elasticity" (note the low Kuder scores for the Mechanical and Scientific areas) If he can make no choice of his own, there is probably more latitude in the field of history (picture-story response was in this area); philology is so specialized that a person cut out for it should sense it of his own accord by the time there is need to specialize

The case is still too recent to discuss in terms of follow-up

Case C. This man, as with the present cases generally, was selected on the basis of deviant instruction times, without reference to factors entering into referral. Actually the rapid DAT instruction times are a minor symptom in a complicated picture with various pathological aspects The questions raised in referral concerned (*a*) a general confusion of career objectives that might be partially clarified by discreet use of tests, (*b*) projective response as related to atypical psychodynamics. Entrance medical history denotes an upper middle economic status, gives some account of mild depressive episodes prior to college, and a present similar condition reactive to immediate environmental difficulties. Athletic participation slight, and cultural motivation assessed low for this group, though the depressive picture may have influenced this. Something very like a "thinking difficulty" is reported by the man himself, with reference to his academic work.

The psychometric situation is baffling No entrance test data are available, though there is prima facie evidence for a good undergraduate record. The field of work is as much verbal as quantitative, and the vocabulary score is

1.5 sigma high, among the best observed. This is not a time function. The verbal speed alpha, specifically a time function, is .8 sigma low; but the number alpha, similarly speeded is over 1.5 sigma high, the number-series-completion subtest over two sigma high. The DAT record presents a contrast of instruction time and test score, in favor of the instructions. The sigma disparities between these functions are for the subtests used: Verbal Reasoning 1.36, Numerical Ability 1.38, Mechanical Reasoning 1.39; Space Relations 92, Abstract Reasoning .87. Projective work was of considerable dynamic interest, but bears on the present issue only in that self-administered portions, took very long. (In the face of a record with many psychopathological features, word-association response was comparatively bland and unretarded.)

These data are resistant to bringing under any formal principle Where time-pressure is reduced (self-administratively), work is slowed. In the presence of the examiner, he is faster, but not consistently so; at his best in speeded quantitation, next in the comparatively unspeeded DAT instructions, next in the comparatively speeded DAT subtests, and poorest in the more speeded verbal alpha. The differences are rather large to be dismissed as "chance", cf the +1 5 vocabulary against the — 8 verbal alpha

From a practical standpoint, there is evidence for high intellectual capacity, whose functioning is superficially erratic, perhaps influenced in some now inexplicable way by the special psychodynamics As this was not without features of grave import, the sequel is gratifying to record. Under psychiatric help, and by the grace of an insighted and "snafu-tolerant" mate, he is now nearly symptom-free.

Case CI Another instance of disproportionately slow instruction times The problem of referral (not psychiatric) concerns career orientation, towards which academic difficulties have arisen.

Middle economic status. Indications of over-intellectualized home background, with inadequate affectional components. (Linearity 13 0.) Good grades before coming to this institution, "bright" impression on admission interview, though socially less promising, but medical examination rates maximally for well-organized speech, and generally above average Present referral sums up as "a very egotistical, but able boy who is losing face for poor academic performance and is trying to wriggle out by using career choice as a scapegoat. . . . "

In describing his test performance the first thing noted was a sort of compulsive attitude towards untimed tests, leading him to take two or three times as long on them as is average. Thus something over an hour was spent on the Zyve Scientific Aptitude Exercises E, J, and K, with subaverage performance on J and K, but a perfect score for E (query, why?) Instruction time to Thurstone PMA Number Series was 2.8 sigma long, but the score itself is only .6 sigma low. An inordinate time, over five sigma long, was spent on DAT general instructions. In the actual DAT tests, this is much less pronounced. Verbal Reasoning actually shows better instruction time than test score, and for Numerical Ability the two are equal. For Mechanical Reasoning the disparity favoring the test score is .74 sigma; for Space Relations 1.10 sigma; for Abstract Reasoning 1.25 sigma. Thus the speed of work improves somewhat as the pressure of time is applied. Where this is minimal, there is marked slowness.

As to the absence of projective data for this case, (*a*) the slowness described prevented completing a contemplated schedule, (*b*) they appeared somewhat less relevant to the referral problem. They should of course have been included, as the event emphasized. The time tests scored not far from local averages (though with more error than one likes to see), irrespective of area involved. No significant differentiation of abilities was shown. Basic capacity for academic survival could be inferred from both this and previous records, "but there is shown a difficulty with application that borders on the pathological."

Continued difficulties led to subsequent psychiatric contacts. Here a picture emerges contrasting with that on admission, "confused, repetitious, almost incoherent at times." Attention is drawn to an over-restricted upbringing, with the problem of adjusting to the demands of freedom. He was considered to be "depressed" and to have been so "for some months." This would be consistent with the abnormal character of the test responses.

In DAT observations as with the Alpha, fast instruction times have here gone regularly with good test scores, and slow instruction times may do so. It is easy to rationalize the converse, fast instruction times with inferior test scores (hasty reading, imperfect comprehension, consequent inadequacy with test material), but the actual observation is rare. The following appears to be as well defined an instance as to be found in the material.

Case CII. This young fellow came to psychiatric attention with reference to the dynamics of a not atypical "juvenile delinquency." A general deficiency in career objectives contributed to later psychometric referral.

Home background moderate economically, good intellectually. Preadmission rating as rather tense, over-reactive. Medical examination trait-ratings lower than in most cases here described, lowest for athletic participation, best for cultural attitudes. Considered immature, but a good risk. Linearity 13.7.

Entrance SAT +.37, MAT —1.2. Predictive rank perhaps .6 sigma low.

Here, appeared at disadvantage in multiple choice tests, particularly with verbal material, because sensitive to finer differences of meaning than such tests are able to represent (cf the tenseness, over-reactivity above mentioned, in relation to Kempfian formulations). This showed itself in good critical comments on certain test items. Rorschach R over a sigma above local average, heavily detailed, strongest in Movement, though with fair development of Color, Originality, and Organization. Vocabulary tested well over local average. On the other hand DAT, critical for present purposes, was throughout well below local average, the subtests ranging between —.71 and —1.14. The sigma disparities with the much faster instruction times are for Verbal Reasoning 1.94; Numerical Ability 2.04; Mechanical Reasoning 1.65; Space Relations 2.35, Abstract Reasoning 2.07. Along with this is one of the largest proportions of error recalled; in fact the number of items "attempted" may be well up towards local average. In Space Relations more responses were skipped than answered. The observations thus represent a very rapid and reasonably effective *understanding* of tasks, with comparative failure in their execution owing to too low thresholds of response, leading to errors and indirectly to the above "skips" of Space Relations. This is the way in which the temperamental characteristics previously cited would be manifested psychometrically, as much could be said of the "delinquent" episode that brought him to present attention.

Except for trends towards verbal over quantitative abilities, the observations are without relevance to career objectives. The concept of "adolescent instability" may well have been based on episodes such as here involved. A subsequent maturation is indicated in academic record very steady and somewhat improving, and involving no disciplinary action.

Discussion

The above cases illustrate a variety of determinants in a function like instruction time, such as is present, though perhaps not to the same degree, in test scores also. In Case XCIX a high "Catabolic" factor associated with a high intellect, produces especially short instruction times with correspondingly high test scores. Case CII illustrates the distinction between vigor of the "catabolic" factor, and the height of its threshold (Kempf states it rather in terms of quickness of reaction). In this case the extreme situation seems better accounted for by low threshold (Kempfian A-?), than by vigor of response (Kempfian C+). Cases XCVII and CI present the retarding effect on instruction time of anxiety and its offspring compulsivity. Cases XCVI and XCVIII offer contrasts in catabolic threshold, the former generally low the latter high, but modified under stress. No patterning in these terms appeared assignable to the performances of Case C.

A study of this sort is based on printed test instructions exclusively; where all one needs to say to the examinee is to read them, and let you know when he is ready. Such a procedure is available only under conditions not usual in psychometric work, but close to their optimum in this instance.

Among all techniques of communication, the unstylized printed word has probably the least stimulus value. It has satisfactory stimulus value for purposes like this, only with individuals who (*a*) are endowed with sufficient capacity for dealing with language symbols (probably well above average, possibly as high as the 90th percentile)[4], (*b*) have been especially conditioned to respond to this sort of stimulus, which conditioning is among the functions of higher education. There is a gradient of intellectual sensibility which affects the medium of communication best suited to convey a test-instruction or other means to influence behavior. Its near-maximum is found in such as those who can spend two minutes or more assimilating directions for the DAT Space Relations test, and forthwith work on the test in a perfectly straightforward manner; its near-minimum in persons who, though in a governmentally coercive situation, "pay absolutely no attention to any order unless it is shrieked at them" (Cf Gletkin's fat little peasant in Koestler's *Darkness at Noon*, II, 2, or the admonished smoker, "It didn't say positively"). The implications of this sensibility gradient, and their practical applications, may be observed through wide ranges in the differential use of typefaces, color, pictures, etc., in publications addressed to various socio-economic levels, especially in advertising pages.

In most psychometric test instruction one has to guard the more against understimulation. The stimulus value of the spoken word is clearly greater than that of the printed, indeed critically greater. The spoken word is normally used for clinical test instruction; and in group tests, it is customary to give the printed instructions oral reinforcement. Early experiences of the writer's with Army Alpha were illustrative in this respect Disregarding the first subtest, the others could with a graduate student group, be used without oral reinforcement, except the analogies and number series completion, which normally required it. It was some years before the art of test instruction developed sufficiently to make procedures of this sort usable without oral reinforcement, save for very high grades of intellectual sensibility. Much, possibly all of the Thurstone 1938 PMA series can be so used, and the same should be true of many subsequent series, granted always the necessary qualifications, intellectual and temperamental, in the examinee.

Examples of this instructional gradient, with increasing stimulus values, are the present uses of DAT (printed instructions only), group alphas and most educational tests (printed instructions plus oral reinforcement); Wechsler-Bellevue and most clinical tests (oral instructions essentially); Army Beta (demonstration); Knox Cube (imitation)

In the upper reaches of intellectual sensibility (perceptivity) which are dealt with here, one should guard rather against a certain overstimulation. Where the examinee is perfectly capable of responding to printed instructions, the use of oral ones is probably undesirable. It introduces superfluous social factors into a situation that can and should be an essentially intellectual one Some years ago, the writer was led to experiment with reducing the Wechsler-Bellevue-Verbal material to printed form, for the normal oral response. This would have limited application in an out-patient clinic, or for the population generally for whom the scale was designed; but there is no question of its greater efficiency for the sector that is here dealt with, on the not very common occasions for its use in such a setting.

Printed instructions have a quality of uniformity that is lacking in oral ones. This uniformity is not always an advantage, as this writer, and doubtless others, have pointed out long since. In pathological situations especially, there is need for more flexibility in formulating instructions. Some tests seem as such to need this flexibility under all conditions, the word-association procedure for example. But that ink-blot and picture-story techniques are satisfactory with wholly printed instructions in populations of the present type, is believed to have been demonstrated.

Mutatis mutandis, like considerations apply to response. An old item in "introvert-extravert" classifications is that the extravert talks better than he writes, the introvert writes better than he talks. In the maturer terms formulated by Sheldon and Stevens, the cerebrotonic finds it not especially easy to do either, but easier to write, because this escapes the social (though not the legal!) involvements of talking. Somatotonia may be trusted to prefer the more direct and forcible (cf. "man-to-man") medium of talk, in the same way as it is by comparison impervious to and/or irritated by, the written (not to say printed) communication. Such preference is of course also subject to conditioning. Readier test-response of average young adult males through vocal media, observable on recent armed service induction lines, probably had both determinants.

The distinction of temperament involved in written and oral response is comparable, though hardly parallel, to the familiar one between "verbal" and "performance" response Written response, like instruction, favors the cerebrotonic, multiple choice response probably more than open-end; the comparative status of oral and manipulative "performance" response is much less clear For the cerebrotonic, manipulative response has the advantage of being less socially involved, as well as some chance of a more favorable conditioning. On the other hand, the satisfactions of doing rather than talking have a relatively somatotonic appeal, also reinforceable by conditioning. There is ample room for conflicting findings in this field, according to the sorts of populations dealt with The extent to which these motivational factors enter into individual test performances is extremely difficult to assess, and perhaps the chief obstacle in the approach to clinical validity of our psychometric devices

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AN EXPERIMENTAL TEST OF LATENT LEARNING IN A RELATIVELY FREE-CHOICE SITUATION*

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A. The Problem

The problem investigated by this experiment arose as a result of the controversy concerning the validity of the concept of latent learning. That is, can learning occur in the absence of motivational satisfaction, or must some motive be satisfied for learning to occur?

Blodgett (1) precipitated this controversy in 1929 when he published experimental results which he interpreted as showing that learning may take place in the absence of motivational satisfaction. Such learning he termed "latent learning". Since that time many experimenters have attempted to test the validity of this concept. Some, Elliott (2), Haney (4), Herb (5), Leeper (11), Seward (13), Tolman and Honzik (15), have found evidence which they interpreted as supporting the concept of latent learning, others, Grice (3), Karn and Porter (8), Kendler (9, 10), Reynolds (12), Spence and Lippitt (14), have found evidence which they interpreted as denying the validity of the concept.

In general, these results represent two opposed groups of learning theories, the field theories and the stimulus-response (*S-R*) reinforcement theories. Probably the most representative of the field theories is that of Tolman, referred to variously as the "sign-significate" theory (9) the "sign-gestalt-expectation" theory (9, 10, 13, 14), and the "expectation" theory (3, 16). (In this paper the term "expectation theory" will be used.) According to this theory, learning is the formation of cognitive patterns within the organism corresponding to the stimulus relationships in the environment. These cognitive patterns were formerly called "sign-gestalt-expectations" (15), but recently Tolman has shortened this to "field expectancies" (16). He insists that the acquisition of field expectancies is not dependent upon differential reward or reinforcement. Even the two types of learning for which the reinforcement principle is believed to be valid, cathexes and equivalence beliefs, are explained by Tolman (16) in terms of central phenomena rather than in terms of connections between the stimulus and the response

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The *S-R* reinforcement theory, on the other hand, holds that learning is the establishment of definite connections between the stimulus and the response, and that these connections are formed only in conjunction with motivational satisfaction.

Thus, the concept of latent learning is highly important to both theories, since its validity would support Tolman's claim that acquisition does not necessarily depend upon motivational satisfaction, but such validation would be fatal to any reinforcement theory. Therefore, it would be desirable to design an experiment which would answer this question conclusively. However, some of the difficulties involved are indicated by the following considerations:

1. Experimental results supporting the concept of latent learning must necessarily show that learning occurs in a situation in which *no* motive has been satisfied.

2. Experimental results denying the validity of the concept of latent learning must show either (*a*) that *all* learning called latent learning is really due to the satisfaction of some motive either unnoticed or uncontrolled by the experimenter, or (*b*) that learning *never* occurs when the motive or motives present are not satisfied. Hence, it would be all but impossible to design an experiment to disprove the reality of latent learning.

The present experiment, then, was designed to answer the specific question: Can a white rat learn the location of an incentive (food or water, in this case) by simply coming into contact with it a number of times, when that incentive has never satisfied a motive in that particular location? An affirmative answer would be interpreted as supporting the concept of latent learning, while a negative answer would be inconclusive, merely showing that latent learning was not demonstrated in this particular instance. However, negative results would be more consonant with the *S-R* reinforcement theory.

B. EXPERIMENT I

1. *Animals*

The animals used in both the present experiments were white rats from the colony maintained by the University of Arkansas. All animals were reared in wire cages, several to a cage, in a uniformly heated room. They were 35 days old at the beginning of the experiments. None had had any previous maze experience. In Experiment I, 20 animals were used, 10 males and 10 females. The animals were maintained on a diet of Purina Dog Chow pellets, each animal receiving five grams daily. In the pre-experimental stage water was in the living cages at all times.

Before the beginning of training, the animals were handled frequently and so were not wild. Each animal was put in a separate cage three days before the beginning of the experimental period and was kept there throughout the experiment.

2. *Apparatus*

The apparatus used consisted of a starting stand, five inches wide and 11 inches long, connected by a pathway, three-fourths of an inch wide and 40 inches long, to a table surface which was three feet wide and six feet long The starting stand and the pathway were painted flat black and the table was covered with heavy brown paper. The whole apparatus was elevated to a height of three feet above the floor Two goal boxes were used. These were nine inches wide, 11 inches long, and five inches deep. They were fitted with wire mesh covers so that the interior was observable by the experimenter. To facilitate discrimination, one of these boxes was painted flat black; the other one was painted white They were not fastened to the table and so could be moved to any position. Small glass casters were used for food and water containers.

This apparatus was housed in a room lighted by two large windows on one side, and a drop light, fitted with a 150-watt bulb, hanging almost over the center of the apparatus and about four feet above it. In Experiment I, the apparatus was situated so that one window was just opposite the starting stand Thus, the animals were running toward the window.

3. *Procedure*

During both experiments the goal boxes were placed on the table in prearranged positions. Four positions were used, designated as right front (*RF*), left front (*LF*), right rear (*RR*), and left rear (*LR*). The *LF* position was a mirror image of the *RF* position, while the *LR* position was a mirror image of the *RR* position In a given trial, if the white box was placed in the *LF* position, the black box was placed in the *RF* position. The same is true for the *LR* and *RR* positions This procedure was followed so that no goal box would attract the rat more than the other because of proximity. The boxes were moved to different positions after each trial so that no rat was required, in order to make a correct choice, to go to the same position on two successive trials, or to go to the same position as had the previous rat. This was done to prevent tracking and to aid in breaking up position habits.

During the training series in Experiment I, 10 of the 20 animals used were motivated for food, but satiated with water (Group *H*), the other 10 were motivated for water, but satiated with food (Group *T*) Motivation was produced by depriving the animal of food, or water, as the case demanded, for 22 hours before the beginning of the daily trials That this procedure was effective was indicated by the fact that all animals, when allowed, consumed the incentive for which they were motivated. Satiation was produced by having food, or water, in the living cages at all times and by replenishing the supply just prior to the beginning of the daily trials. The effectiveness of this procedure was shown by the fact that no animal attempted to eat when satiated with food, or to drink when satiated with water.

In Experiment I, all animals were given six trials daily for 10 consecutive days, each trial ending when either one or the other of the goal boxes was entered. Forced runs, which were accomplished by placing a block of the same color as the box over the door opening, were distributed so that each goal box was entered three times daily by each rat A rat was counted as having made a choice when it entered a box by a body's length, exclusive of tail. The choice was recorded as correct if the box entered contained the incentive for which the animal was motivated; the choice was recorded as incorrect if the animal entered the box containing the incentive for which it was satiated At the end of a correct run a hungry animal was rewarded with one half gram Purina Dog Chow; a thirsty animal was permitted to drink for 15 seconds. At the end of an incorrect run the animal was confined in the goal box for 30 seconds without reward, after which it was removed to the home cage to await the next trial. Confinement was accomplished by putting a block before the door of the goal box. All animals were given one trial before the first animal was given its second trial, and all animals were given their second trial before the first animal was given its third trial, etc Thus each daily trial, for a given animal, was separated from the following one by approximately 10 minutes.

Half of the animals found food in the white box and water in the black box; this was reversed for the other half. No differences were noted between these groups

All animals were fed the remainder of their daily ration, or were given water, about 30 minutes after the last daily trial.

During the training series, all animals walked over the food or through the water, even when they were motivated for the other, so that contact cannot be denied.

Motivation was reversed for the critical test which was given on the eleventh day after the beginning of the training series. On the test day procedure was exacly like that during training *except that no forced runs were* given and no confinement followed an incorrect choice. That is, as soon as an animal had made a choice, either correct or incorrect, it was removed from the experimental apparatus and returned to its home cage. These changes were necessary as the purpose of the tests was to see how the animals would perform when allowed to make a free choice.

That a white rat has the ability to discriminate between a hunger stimulus and a thirst stimulus has been adequately demonstrated by both Hull (6) and Leeper (11) in experiments in which rats learned to go to the food side of the maze when hungry and to the water side of the maze when thirsty Jones (7) has demonstrated that such discrimination is possible in a situation such as that found in the present experiment. He ran 20 animals using the same apparatus and following the same procedure as used in the present experiment except that the motivation was alternately hunger and thirst and no forced runs were given. On the last day that the rats were motivated for water, Day 11, the rats made 85.4 per cent correct choices; on the last day that they were motivated for food, Day 12, they made 82.5 per cent correct choices. The probability that these results could be due to chance is only one in 100

4. *Results*

On the last day of training, Day 10, all animals, when given a free choice, chose the box containing the incentive for which they were motivated, indicating a rather high degree of learning. The average time per trial ending in a correct choice was 11 3 seconds as compared with 19 9 seconds per trial ending in an incorrect choice. There is a significant difference between these average times, further indicating that the animals had learned the problem reasonably well.

The results of the test runs, on Day 11, are given in Table 1. On the test day under changed motivation Group *T* made only 20 correct choices out of 60 trials, or 33.33 per cent; Group *H* made 25 correct choices out of 60, or 41.67 per cent. Collectively, they made 45 correct choices out of 120 trials, or 37.5 per cent. No animal made a correct choice on the first trial of the

TABLE 1
NUMBER AND PER CENT OF CORRECT CHOICES MADE BY ANIMALS ON TEST DAY (EXPERIMENT I)

	Number trials	Number correct	Per cent correct	P*	P**
Group *T*	60	20	33 33	.01	.01
Group *H*	60	25	41.67	01	.20
Both	120	45	37.50	01	01

*Based upon expectation of 100 per cent correct choices on test
**Based upon expectation of 50 per cent correct choices on test

test day and most of the correct choices were made on the fourth, fifth, and sixth trials (15 for Group *H*; 13 for Group *T*). No sex differences were found.

5. *Discussion*

Since on the last day of training all animals chose the correct box when given a free run, latent learning would have been clearly demonstrated if all animals had chosen the correct box on all, or most, of their test trials, and especially if they had chosen correctly on the first trial on the test day. Actually this was not the case, as no animal made as many correct choices as incorrect, and no animal made a correct choice on its first test run

In the case of Group *T* we would have expected 60 correct choices whereas only 20 correct choices were made. This difference is significant well beyond the one per cent level. In the case of Group *H* we would expect 60 correct whereas only 25 correct choices were observed. This difference, too, is significant at the one per cent level

But suppose that we had no reason for assuming that the animals should do better than 30 correct choices out of 60, as would be expected on a chance basis. For Group *T* we find again that the difference between the number of correct choices expected and the number obtained is significant at the one per cent level. For Group *H* the difference is not so significant, *P* being only 20; that is, 20 chances in 100 that this difference could be due to chance. This, however, might only indicate that the group of animals had not learned the problem as well as had the group trained while thirsty. The probability that this is true is given credence by the fact that the thirst drive has been shown to be stronger than the hunger drive (17), and that learning proceeds more rapidly under conditions of thirst motivation (7) But for the two groups combined we still find that the difference between the expected results and the obtained results is significant at the one per cent level

These are the results that would be predicted by the *S-R* reinforcement theory, but would be denied by most field theories Tolman (16) would probably classify the sort of learning involved in this experiment as "cathexes" learning, and so would predict these results also Nevertheless, the results show no evidence of latent learning Rather, these results are in agreement with the results found by Reynolds (12), Karn and Porter (8), Kendler (9, 10), Grice (3), and others who have failed to find latent learning. The results would not agree with those found by Blodgett (1), Tolman and Honzik (15), Herb (5), and other supporters of latent learning

One explanation of the animals failure to show latent learning might be that the animals had some difficulty in discriminating between the goal boxes

This, however, is held to be unlikely as the animals apparently were able to discriminate between them during the training series.

The fact that the animals made some correct choices on the test could be explained by the *S-R* theory by the process of extinction. This explanation is supported by the fact that most of the correct choices made on the test were made only after a number of incorrect choices had been made. If this is valid, a greater degree of learning would decrease the number of correct choices made even in the later test trials. Further experimentation seemed desirable.

C. EXPERIMENT II

1. *Introduction*

This second experiment was designed to test the two above mentioned possibilities. By increasing the discriminatory cues, we could not only test the possibility that latent learning was not shown because of difficulty of discriminating between goal boxes, but also the expectation (by *S-R* theorists) that a greater degree of learning would decrease the number of correct choices made on the test trials. For this purpose, one of the goal boxes was lighted by a 15-watt bulb which rested upon the cover of the box The whole apparatus was turned around so that the animals were running away from the window, since it was thought that the glare from the window might have interfered with discrimination

2. *Animals*

Twenty rats, 10 male and 10 female, were used for this experiment. In the pre-experimental stage, they were treated exactly like those used in Experiment I.

3. *Apparatus*

The same apparatus described in Experiment I was used in this experiment The only changes were those mentioned above

4 *Procedure*

With the following exceptions, the procedure followed in this experiment was the same as that followed in Experiment I Ten animals were trained while thirsty, Group *T′*, and 10 were trained while hungry, Group *H′*. For half of the animals the light was always over the white box, while for the other half, it was always over the black box. These groups did not correspond to Group *T′* and Group *H′* That is, five of the animals of Group *T′* found the light over the black box and five found the light over the white box The same is true for the animals of Group *H′*. No differences were noted for these groups

On the test, Day 11, the light was placed over the same box, for a given animal, as it was during the training series.

5. *Results*

On the last day of training, Day 10, all animals in this experiment also made all correct choices on free trials. However, probably the most striking result was the difference in average time between free runs and forced runs. The average time per trial on free runs was 8.5 seconds and for forced runs the average time was 59.1 seconds. This difference is significant well beyond the one per cent level. This huge difference in time is attributed to a high degree of learning and facility of discrimination, as most of the extra time on the forced runs was spent by the rats trying to get into the box containing the incentive for which they were motivated.

The number and per cent of correct choices made by each group on test day are given in Table 2. The animals of Group *T′* made four correct choices out of 60 trials, or 6.67 per cent; those of Group *H′* made 14 correct choices out of 60 trials, or 23.33 per cent. Altogether, the animals in this experiment made only 18 correct choices out of 120 trials, or 15 per cent.

TABLE 2
NUMBER AND PER CENT OF CORRECT CHOICES MADE BY ANIMALS ON TEST DAY (EXPERIMENT II)

	Number trials	Number correct	Per cent correct	*P**	*P***
Group *T′*	60	4	6.67	.01	.01
Group *H′*	60	14	23.33	.01	.01
Both	120	18	15.00	.01	.01

*Based upon the expectation of 100 per cent correct choices on test.
**Based upon the expectation of 50 per cent correct choices on test.

No animal made a correct choice on the first or second test run. Three of the four correct choices made by Group *T′* were made on the last three trials, nine of the 14 correct choices made by Group *H′* were made on the last three test runs. These correct choices are believed to be due largely to extinction brought about by the earlier runs. Only insignificant sex differences were found.

6. *Discussion*

As was expected by the *S-R* reinforcement theory, the introduction of better discriminatory cues resulted in a decrease in the number of correct choices made on the test day. The obtained results eliminated the possibility of the animals having failed to manifest latent learning because of difficulty in discriminating between the goal boxes.

If we assume that the animals should have made 100 per cent correct choices on the test, as would be indicated by their performance on the last day of training, we find that the difference between this expectation and the obtained results is significant well beyond the one per cent level, for both Group *T′* and Group *H′*. If we assume that they should have made only 50 per cent correct choices on the test, as would be expected by chance, we again find that the expected results differ significantly from those obtained. This is true for both Group *T′* and Group *H′*.

The results of this experiment lend support to the conclusions drawn from the results of Experiment I. The results found in both experiments were those expected from the assumption that latent learning is not a valid concept, but would not be expected if the concept is valid. These results are not taken as denying the existence of latent learning or the validity of the expectancy theory, but they are held to be more in agreement with the *S-R* reinforcement theory.

D SUMMARY

1. Latent learning is defined in this paper as any learning or acquisition not exhibited in performance, and which takes place in the absence of motivational satisfaction Two experiments were performed in an attempt to determine if the white rat can learn without the benefit of motivational satisfaction.

2. In Experiment I two groups of white rats were run on a piece of apparatus having two distinctive goal boxes, one containing food and one containing water, which could be moved about on an open surface Group *T*, consisting of 10 animals, was trained under thirst motivation, Group *H*, consisting of 10 animals also, was trained under hunger motivation. Both groups were trained for 10 days, being given three free runs and three forced runs each day. This was done so that each animal would come into contact with both incentives an equal number of times. On the eleventh day the motivation was reversed and six test runs were given The animals of both groups continued to go to the box containing the incentive for which they were motivated during the training series. This result is taken as neither supporting nor denying the validity of the latent learning concept

3. In Experiment II two groups of 10 animals each were run. Procedure was the same as in Experiment I. However, some changes, designed to facilitate discrimination between the goal boxes, were made in the apparatus. Again, all animals continued to go to the box containing the incentive for which they were motivated during the training series. This tendency was even more pronounced than in Experiment I

4. It is concluded that these white rats did not show any evidence of latent learning in these experiments. The results were not interpreted as showing that latent learning is impossible, or that the expectation theory is invalid However, these results are interpreted as being more in agreement with the *S-R* reinforcement theory.

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THE SOCIOLOGY OF PERCEPTION*

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Among the possible divisions of the sociology of knowledge is the sociological study of perception. I say "possible" because I want to present here some methodological considerations bearing precisely on its possibility. The possibility of the sociology of knowledge in general requires, of course, first, the existence of some relationship or other between social fact and the cultural fact which is to be interpreted and, second, the discoverability of the relationship Assuming, however, the possibility of the sociology of knowledge in general, I still find it necessary to consider the possibility of sociology of perception in particular. For, in this putative division of the sociology of knowledge, a problem arises which, in other divisions, either does not ordinarily arise at all in so far as they deal with circumstances occurring in the past or does not arise with the same acuteness in so far as they deal with circumstances occurring in the present namely, the determination of the cultural fact, since, in this division, it is a mental fact and one of a peculiar sort[1] More precisely why the problem does not arise elsewhere either at all or with the same acuteness, we shall see in due time; as yet, we must limit the discussion to perception alone. And, in the interest of simplicity, we must limit it also, as far as we can, to the study of present perception, for, as a study of past, rather than present, circumstances, the sociology of knowledge involves problems of method from which its contemporary aspect, pursued as a contemporary and not as an historical study, is free. Since, moreover, if perception is determinable at all, it is determinable with far greater surety for the present than for the past, the sociological student of perception would be well advised to neglect the perception beyond his experimental access and to deal largely, and perhaps virtually altogether, with perception that occurs during his very investigation

But the notion of perception requires some comment, for there are at least two relevant meanings. Dollard (3, p 37) intends one sense, which

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[1] Some such considerations as those we shall adduce might prove relevant to any, and not merely to a sociological, study of perception, but this wider generality we cannot undertake to establish here.

he refers to, variously, as social or psychological, when he remarks, for instance, that "the middle-class researcher could easily make the mistake of assuming that all Negroes are disciplined middle-class persons like himself, undoubtedly an immortal error in northern perception of the Negro," or that "only acute crisis in a group, such as the defeat of the southern armies, forces a re-canvass of the situation and the gradual stylization of new social perception." But the same writer, I think, though his purport seems not wholly clear, may also intend another sense when he remarks elsewhere (2, p. 277) on "the difficulties which arise in connection with a theory of perception when no account is taken of the fact that a culture is itself a systematic guide to perception for its members, and can be defined as a stereotyped manner of perceiving," and adds that "the idea of a kind of brute sensory perception might seem of very little interest when compared with the study of perception as a function of group experience." The obscurity consists in the problem whether, to "brute sensory perception," Dollard means to contrast social or psychological perception "as a function of group experience," sense perception as such a function, or both. If he means the first, he should not have referred to theory of perception, since this phrase ordinarily signifies theory of sense perception. If he means the second, then—as, of course, under the first alternative—he should clearly have stated so. But I suspect that, failing to distinguish between the two, he actually means both; and no harm will result provided it is realized that two different forms of apprehension are involved here. For the one form, when not "perception" simply, "sense perception" is the usual and unexceptionable term. For the other form, "psychological perception" seems inappropriate because the perception of sense is also psychological; and "social perception," because the apprehension in question is essentially one of meaning, the adjective "social" referring only either to certain conditions under which the perception occurs or to one of the several classes into which meaning may be divided. And some sense perceptions, too, I suppose, could be called social perceptions on one more or less tenuous ground or another—perceptions approximately shared, say, or perceptions whose object or whose instrumentality depends in some manner on society.[2] So I suggest distinguishing between the two forms of apprehension, if one wishes to name them both "perception," by the terms "sense perception" and "meaning perception" But for the sake of simplicity, again, I shall concentrate on the former and ignore any special questions that might arise in connection with the latter.

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[2] As Egon Brunswik (1) uses the term: "The situation peculiar to social perception as compared with simple 'physical'-object perception is that not only the subjects, but also the objects in the experimental setup are persons." Actually, however, the "social perceptions" treated by Brunswik seem to be guesses about the personality traits of persons whose photographs the experimenter presents to his subjects. I doubt that I should regard such guesses or "snap judgments" (*ibid.*, p. 25) as instances even of meaning perception. Brunswik also, in a schema of approaches to experiment, contrasts perception of thing constancies as "intuitive

In order to bring the problem concretely before us, I shall cite what seems a plausible and typical example of the sort of material an investigator might study And such an example I find in a discovery Malinowski (5, p. 204) made among the Trobriand Islanders The example, it will be noted, is one, not of meaning perception, but of sense perception.

> In a matrilineal society, such as the Trobriands, where all maternal relatives are considered to be of the "same body," and the father to be a "stranger," we should have no doubt in anticipating that facial and bodily similarity would be traced in the mother's family alone The contrary is the case, however, and this is affirmed with extreme social emphasis Not only is it a household dogma, so to speak, that a child never resembles its mother, or any of its brothers and sisters, or any of its maternal kinsmen, but it is extremely bad form and a great offense to hint at any such similarity. To resemble one's father, on the other hand, is the natural, right, and proper thing for a man or woman to do

Now, even if I were able to, I should not here undertake a sociological study of this condition, for the present problem turns rather about the nature of the condition. And Malinowski himself does not make such a study. However, the plausibility of the material requires some suggestion of that in the society with which the condition might have something to do. This vague phrase I use so as also to avoid here any discussion of, or implication about, the nature of the correlations established in the sociology of knowledge. It will suffice to point out the following circumstances. First, concerning the denial of matrilineal resemblances: The supreme taboo of the Trobriander (5, p. 519) is "the prohibition of any erotic or even of any tender dealings between brother and sister"; the most insulting comparison of features in the maternal line (5, p. 487) is, in speaking to a man, "Thy face thy sister's." And the taboo diminishes in stringency (5, pp. 522-528) roughly with the degree of remoteness of the female—and the insult, I infer, in intensity roughly (5, p. 487) with the degree of remoteness of the person—

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orientation among physical objects" with social perception as "intuitive orientation in social environment" (*ibid.*, p 28). Presumably he takes the experimental definition above to coincide with this, that we might call his real, definition, but it is certainly arguable that snap judgments in an experimental setup are not equivalent to intuitive orientations in a social environment other than that of an experiment.

from the sisterhood relationship.[3] Moreover, unpleasant experiences must often arise on the maternal side, since a maternal uncle exercises authority (5, p. 7) over a man, and a man contributes to the support of his maternal female relatives (5, p. 121). Second, then, concerning the affirmation of patrilineal resemblances (5, p. 6): With the father (that is, in the sociological sense) one associates love and protection. And here Malinowski (5, p. 208) himself suggests a relationship. "Thus we see," he says, "that an artificial physical link between father and child has been introduced, and that on one important point it has overshadowed the matrilineal bond. For physical resemblance is a very strong emotional tie between two people. . . ."[4] And these circumstances, I think, and I suspect they are typical of the sort of circumstances one would initially find, make the assumption at least plausible that the alleged perceptual condition should have correlates among the social relationships within which it occurs.

Or, if we turn from the social aspect to the perceptual, our present example again seems plausible or as plausible as any; for, with reference to the perceptual, likewise, the example is typical That is, the investigator possesses certain statements and certain behavior from which he must infer to, and only in this way can he reach, the relevant perceptions, and such is always the situation except when the investigator studies his own perceptions. Hence, if it is sociology of perception he claims to pursue, he must show beyond a reasonable doubt that the condition he investigates is indeed perception, expressed in the assertions and by the behavior, rather than a complex of behavior patterns and symbolic expressions which lacks a justification in actual perception And this requirement we shall now consider in reference to the example.

The Trobrianders (5, p. 206) themselves, it is clear, are making assertions about perception. When they "stoutly deny that similarity can exist between matrilineal kinsmen," they certainly mean at the very least that a similarity is not perceived; for, if a similarity does not exist, certainly, they would suppose, it cannot be perceived. Also, when they affirm a similarity between child and father, they certainly mean at the very least that some similarity is perceived; for, if a similarity does exist, certainly, they would suppose, it is both perceivable and, under the perceptually necessary conditions, perceived At all events, to deny the Trobrianders these suppositions would be to attribute to them an implausible and improbable degree of epistemological sophistication Now, Dollard (2, p. 116) remarks that "it would be interesting to know in the comparative study of cultures how vigorously people cling to their actual perceptions despite the overpowering force of the structured theory of the culture." And it would indeed But our problem, I think, is somewhat more subtle and difficult. Recognizing the effective force of the theory of the culture, recognizing, in the present example, that the Trobriand Islanders claimed to perceive what Malinowski did not perceive and not to perceive what he did perceive, we must ask, not how vigorously they clung to their actual perceptions, but, rather, what their actual perceptions were. For, if their actual perceptions were the same as those of the ethnologist, we know already that, so far as he could ascertain, they did not "cling" to them. Were such perceptions, however, even there to have been clung to? Not according to the Trobrianders But the real problem is precisely this. Can we trust their assertions? If we can, and the instance is typical, then sociology of perception is so far forth possible. Or must we believe the contrary to their assertions? If we must, and the instance is typical, then sociology of perception is impossible unless, and to the extent to which, it might be pursued by the use of introspection Or is the case, rather, that one type of assertion can be accepted, while the other must be rejected? If so, then sociology of perception, while possible, is possible only in a limited measure, only, that is, in the positive or, as may be, only in the negative instance Or perhaps, in the end, the answer will not prove as clear-cut as the above alternatives. But we must see

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[3] The comparison of male with male Malinowski does not work out with the same care as the comparison of male with female, and the comparison of female with female he does not work out at all

[4] When one inquires "why it is that people resemble their father, who is a stranger and has nothing to do with the formation of their body, they have a stereotyped answer: 'It coagulates the face of the child; for always he lies with her, they sit together'" (5, p. 207)

Let us consider first the positive instance, in which non-existent resemblances were declared to exist And the question is this: Granted that the resemblances in the paternal line did not exist in the perception of the disinterested observer, did they, nevertheless, exist in the perception, as distinguished from the expressed belief, of the interested observer?

But here I should pause, I imagine, to recognize that the taking of the ethnologist's perceptions as the criterion for the reality or unreality of resemblances will be criticized It will be said, I suppose, that the ethnologist himself was "interested" in the situation (as indeed, in an evident sense, he was) and that, therefore, we can lay for him no more claim to the title of disinterested observer than we can for his subjects If the objection proceeds from the assumption that there is no such thing as disinterestedness and that what seems to each man is to each man or that what seems in each culture is in each culture, with no hope, ever, of applying any criterion to the seeming, then the issue lies far deeper than the present discussion and cannot be treated here. I might note, however, that the impossibility in principle of a disinterested observer would make all social science impossible and that there would be no reason, in consequence, to discuss any division of it or any (of course pseudo-) problem which arises in it And, in any event, our problem here is the problem what really does, perceptually, seem to a man Or, if the objection refers only to the particular observer in the particular case, then it signifies nothing for us, since the particular case does not matter; we could just as well suppose the case to be hypothetical, provided only that one grants the possibility in principle of a disinterested observer. Or, if the objection rests merely on the fact that the ethnologist is interested as a scientist is interested, then it is trifling and in fact silly Perhaps a technical consideration would be prosaic in a matter of high argument, but I might point out that the physical anthropologist should be the man most qualified of all to detect resemblances and dissimilarities, and I presume that Malinowski was not altogether ignorant of the physical branch of his discipline. Finally, I think the remarks to follow should themselves justify in considerable measure our reliance on the ethnologist's report of his own perceptions as the criterion

Well, then, it might seem that nothing could possibly bear on the question whether the interested observer does perceive nonexistent resemblances. I suspect, however, that something does. For, in commenting on the asserted resemblances of any child to its father, Malinowski (5, p. 206) asserts that, "where it is really found, even to a small degree, constant attention is drawn to it as to a thing which is nice, good and right." In other words, he implies a ground for distinguishing between the genuine and the merely alleged perception of resemblance, and the ground consists in the differential behavior of the interested observer: where there is no resemblance, the Trobriander will assert it as a matter of dogma—and, no doubt, of sincere belief—but will not ordinarily, unless challenged, dwell on it; while, where there is a resemblance, the Trobriander will ordinarily take constant advantage of the evident fact. And I do not see how one could well explain this difference in behavior except by some difference in the perceptions of the interested, which would correspond to the difference in the perceptions of the disinterested, observer. For, unless the Trobriander were, however vaguely, aware of a difference in the situations perceived, he would have no stimuli to the different responses he has made to the two different situations But, if, as we must therefore assume, this difference does exist in the actual perceptions of the interested observer, then we cannot speak here of sociology of perception but only of sociology, say, of expressed belief. In order to claim legitimately that he is pursuing sociology of perception, the student would have to establish beyond reasonable doubt that there exists no differential behavior pointing to a difference in perception. And to do this, be it noted, he cannot rely on the account of someone who is not concerned with, and perhaps not even aware of, his peculiar problem; it is mere good fortune that Malinowski provided us with the unemphasized clue we have worked from. So I infer that sociology of perception in the positive instance can be pursued, if at all, only by a student in the field or the laboratory, for he alone has the opportunity to eliminate, by the most thorough investigation, the chance of a differential behavior.

Now, second, let us consider the negative instance, in which existent resemblances were denied to exist. And the question is this. Granted that the resemblances in the maternal line did exist in the perception of the disinterested observer, did they, nonetheless, *not* exist in the perception, as distinguished from the expressed belief, of the interested observer? This question seems rather more difficult than the first. If we answered by analogy with the above discussion, we should have to say that the Trobriander, in spite of his beliefs, really does perceive the resemblances, where they exist, between matrilineal kinsmen and that the perception, again, would be indicated by differential behavior. Unfortunately, however, Malinowski gives no hint that the Trobrianders behave differently when the resemblance really does not exist from the way they behave when it does exist. On the contrary, everything recorded of their behavior is compatible with the hypothesis that they actually do not perceive real matrilineal resemblances. Although they claimed, for example, that each of the five favorite sons of To'uluwa by Kadamwasila was "exactly like" his father, they repudiated indignantly the heresy "that this similarity to the father implied similarity to each other" (5, p. 207). Such contraventions are also compatible, of course, with the hypothesis that actually the Trobrianders can and do perceive matrilineal resemblances but refuse to admit, probably even to themselves, that they do. But I suspect that these contraventions deserve more initial credit than the contrary assertions in the positive instance (to neglect the differential behavior we noted earlier). For, despite the occasional occurrence of hallucinations and the more common but still occasional projection into perception of what one expects or desires or fears to perceive, far more common, so common indeed as to be ordinary, is the failure to perceive what one either has no interest in perceiving or firmly desires not to perceive. But this consideration is by no means so decisive as to require one, forthwith, to concede the legitimacy of sociology of perception in the negative instance. Here, too, analogously, one cannot rely on the absence of observations of differential behavior in the accounts of others And sociology of perception in the negative instance, too, then, can be pursued only, if at all, by the investigator in the field or the laboratory.

Of meaning perception, I think it should be unnecessary to give any further instances than the two briefly quoted from Dollard. I need only point out that, for meaning perception, the methodological problem includes the problem that arises for sense perception—how, namely, to be sure that the subject does apprehend the meaning he claims to apprehend, rather than merely express the claim on grounds of convention or, more probably, of conventional conviction.

Since I have adverted to the possibility, perhaps I should say a brief word, before going on, about the pursuit of sociology of perception by, or through, trained introspectors I am afraid that we cannot take this suggestion very seriously. The perceptions of the trained introspector are not perceptions that the sociologist would take much interest in. They would certainly not furnish him with much material. The process of self-conscious observation would probably put out of play the sociological factors—or, more neutrally, eliminate any sociological relevance—except for what might inhere in the introspective situation itself And all the objections to the introspective method in general would apply here as elsewhere

I must now return to a matter postponed from the beginning, where I said that the problem of the determination of the cultural fact either does not arise, or does not arise with the same acuteness, in other divisions of the sociology of knowledge. In so far as the problem does not arise at all, that is partly because the sociology of knowledge deals to a large extent with "overt" rather than "covert" culture. This statement will seem strange, I know, since Linton (4, p. 38), classes knowledge, attitudes, and values together as the covert aspects of a culture, in contrast to kinetic behavior and the products of industry, which constitute the overt aspect But actually, I suggest, the "knowledge" of the sociology of knowledge is, to a large extent, rather a product of industry than a psychic state—a product primarily, to be sure, of mental than of physical industry. That is to say, the sociologist of knowledge as historical scholar (and even contemporary fact may be treated by historical methods) deals with symbolic expressions, objectively recorded, and hence immediately accessible to him, and what he correlates sociologically are these recorded and thus overt expressions Or, in so far as he does not correlate the recorded expressions, he correlates no more than his understanding thereof or an ideal-typical construct therefrom; so that the case is in no way altered Even yet, the problem does not arise For the understanding or construct is in his mind, not (though the former might occasionally chance to be) in the minds of those who originally expressed the symbols; and he therefore, as historical sociologist of knowledge, controls the subject-matter as one does not control it when one pursues sociology of perception conceived as a contemporary investigation. Save within his own mind, which is immediately accessible to him, there is, in other words, no mental fact, no covert culture, to be determined And whether it is worthwhile to correlate his own ideas with the social circumstances of someone else or in what sense, indeed, the sociological correlates themselves actually are such circumstances—here we have quite other questions, which cannot be treated now.

The case may somewhat alter when the sociologist of knowledge falls to interpreting the belief, attitude, or value which the expression expresses. Then he does treat the covert aspects of culture. But I think that the problem of determining a present mental fact arises acutely, nevertheless, only with perception; for it does not seem methodologically of peculiar difficulty to determine beliefs, attitudes, and values, provided that they exist in the present (although, of course, the sort of evidence deliberately sought out in the present occasionally does happen to prove available for the past) While we cannot take an expression on these states of mind as self-authenticated, it can be, in principle, easily verified by behavior. If the subject behaves as he would not have behaved, so far as we can determine, did he not really possess the belief, attitude, or value in question, then we justifiably attribute that state of mind to him as his own. Malinowski again provides us with an illuminating example. Did the Trobrianders, he wondered, really believe their denial of physiological paternity? Then genuine convictions should appear, he felt sure, in their treatment of the most cherished members of the household, the domestic pigs (5, p. 190):

> The village pig is considered a great delicacy, while the flesh of the bush-pig is one of the strongest taboos to people of rank in Kiriwina, the transgression of which they hold in genuine horror and disgust Yet they allow the female domestic pigs to wander on the outskirts of the village and in the bush, where they can pair freely with male bush-pigs On the other hand, they castrate all the male pigs in the village in order to improve their condition Thus, naturally, all the progeny are in reality descended from wild bush sires Yet the natives have not the slightest inkling of this fact

Again, the Trobrianders likewise allow their valued European sows to mate with native boars of the bush, though they could easily mate them with European boars (5, p 191). Their attitude toward their own children gives further evidence (5, p. 193):

> One of my informants told me that after over a year's absence he returned to find a newly born child at home. He volunteered this statement as an illustration and final proof of the truth that sexual intercourse has nothing to do with conception And it must be remembered that no native would ever discuss any subject in which the slightest suspicion of his wife's fidelity could be involved.

Can one very well doubt, in the face of such evidence, that the denial of physiological paternity represents, not a mere convention, but a real conviction? I think not. Nor was the evidence methodologically difficult to obtain.

It might seem that the determination of a perception is precisely analogous to the determination of a belief, attitude, or value, and that the same behavioral test would serve in the one case as in the other. Unfortunately, however, this is not so. For the same behavioral test would reveal, not necessarily that the subject has a certain perception, but only that he has a conviction about—or attitude concerning or set toward—the perception. It might be argued that one could devise tests which would establish in complex instances, either of sense perception or of meaning perception, a fact of perception rather than a fact of conviction or attitude or set. However, it would be of no avail to indicate such and such a method of determining perceptions if the perceptions thereby determinable were perceptions which could not, whether in principle or in fact, be correlated sociologically with scientific profit.

But there is this consolation: that, even if the would-be sociologist of perception is not, as he hopes, investigating perception, he may still not have wasted his efforts On the contrary, if the supposed present perception is not an actual perception, his efforts still produce results as valid as they would have produced if their object had actually been perception. For the correlations would apply, in any event, perhaps to the more easily ascertainable mental states or, if not to covert culture at all, at least to something else which is undeniably real—to that from which one erroneously inferred to the covert state, namely, to the overt cultural manifestations of physical behavior and of symbolic, especially verbal, expression.

In answer to the question whether we can trust the assertions of interested observers about their perceptions, I say, then, that we cannot If, therefore, we have nothing more than their own reports to go on, the sociological study of present perception fails, at the very beginning, from the inability of the investigator to determine what the perceptions he proposes to investigate really are And it is evident that this fact holds generally and not merely for the example we worked from The possibility of so much as undertaking a sociological study of present perception rests, in consequence, on the development of adequate methods for the determining of the perceptions and on the successful applications of those methods. And it is not the armchair scholar, but the student in the laboratory or the field, to whom the task of actual investigation must fall.

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PERFORMANCE OF NORMAL AND BRAIN-OPERATED MONKEYS ON MECHANICAL PUZZLES WITH AND WITHOUT FOOD INCENTIVE*[1]

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A. INTRODUCTION AND PROBLEM

In previous studies Harlow, Harlow, and Meyer (4) and Harlow (3) have shown that monkeys learn to solve mechanical puzzles and maintain this performance for many trials without food or any other extrinsic incentive A manipulation drive was proposed to account for both the learning and the persistence of the behavior. In the present investigation mechanical puzzle performance is measured over a longer period of time than in previous investigations Brain-operated as well as normal monkeys are used as subjects, and the effect of an interposed food-incentive condition is analyzed.

B. SUBJECTS

Sixteen macaque monkeys served as subjects. All had extensive testing experience and, with the exception of the occipital group, identical laboratory histories. Four were normal, four had undergone extirpation of one occipital lobe, four had been subjected to extensive unilateral decortication (subsequently designated as the *EUD* Group), and four had undergone extensive unilateral decortication plus removal of the lateral surface of the remaining frontal lobe (subsequently designated as the *EUDALF* Group) Extensive unilateral decortication involved sparing only of Areas 4 and 6, and 3, 1, 2.[2]

C. APPARATUS

The essential apparatus was the mechanical puzzle illustrated in Figure 1. It consisted of a board on which were mounted the six devices: a vertical pin, a horizontal pin, a door-stop, a bolt, a hasp, and a hinge. These devices were so arranged that they could be opened only in serial order and, once released, did not automatically close. Actually, closing of the devices by

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[2] All of the operated monkeys were chronic preparations and had been allowed a minimum of 90 days postoperative recovery

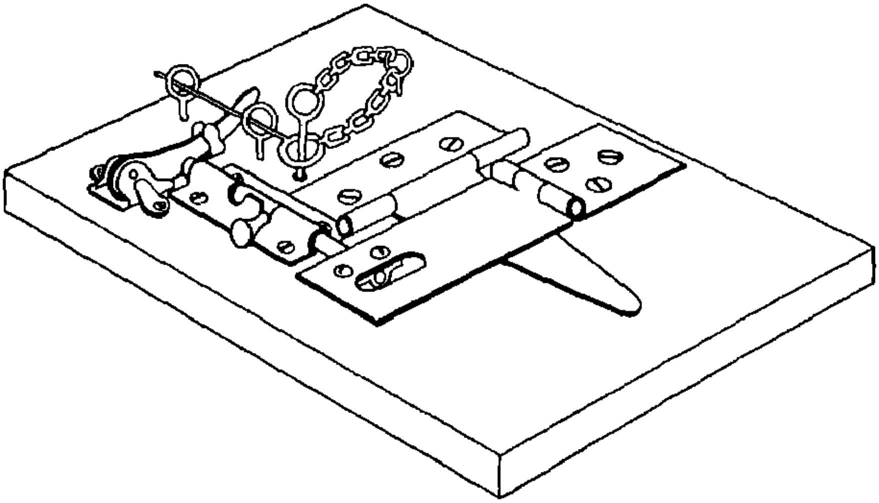

FIGURE 1
SIX-DEVICE MECHANICAL PUZZLE

the monkeys was never observed, save for the hinge. The apparatus was screwed to a wooden perch 24 in. long and 8 in. wide fastened to one side of an inside living cage approximately 36 x 36 x 36 in. The monkeys had access at all times through a runway, to a larger outside living cage.

D. PROCEDURE

Because of space limitations only half of the monkeys could be tested at any one time. This made it necessary to divide the 16 monkeys into Groups I and II, equated for operative condition. Assignment of individuals to Groups I and II was made using a table of random numbers. The members of each group were randomly assigned to a row of eight adjoining individual cages.

Each monkey had a puzzle in his cage continuously for 36 days. The puzzle was assembled at hourly intervals, 10 times each day (7 A.M. to 4 P.M.), and a record of performance was taken one hour after each assembly. Performance was measured in terms of total device openings and attacks, the latter defined as the opening of one or more devices.

The experiment was divided into three periods of 12 days each. During the first and third periods, Days 1-12 and 25-36, the puzzle was presented to all the subjects without any food incentive. For the second period, Days 13-24, each group of eight monkeys was subdivided into previously assigned

Food and No-Food Groups having all operative preparations equally represented. The procedure for the No-Food Group was unchanged, but each member of the Food Group had a raisin placed under the sixth device of his puzzle at each assembly on the 12 days of this period

Throughout the period of the experiment, the animals were fed, as is customary for the colony, at 6 P.M daily. Water was available at all times.

E. EXPERIMENTAL DESIGN

The independent variables of this experiment are *Incentive conditions, Operative conditions,* the three 12-day *Periods,* four 3-day *Subperiods* within periods, and *Groups.* This is a repeated 2 x 4 x 12 factorial design.

F. RESULTS

A summary of the analyses is given in Table 1 These variance ratios are computed by dividing the mean squares for the listed effects by the mean square resulting from the summation of the second order interactions and the one third order interaction. If the third order interaction is used as the error term the results are essentially the same as those shown in Table 1, with none of the second order interactions proving significant. Because of possible heterogeneity of variance and possible non-normality of the distributions, significant effects were not claimed unless statistical tests attained the 1 per cent level of confidence.

TABLE 1
SUMMARY OF ANALYSIS OF VARIANCE FOR TOTAL ATTACKS AND TOTAL DEVICE OPENINGS

Source	*df*	Total attacks	Total device openings
1. Incentive Conditions	1	9.69	.29
2. Operative Conditions	3	128.48***	115.72***
3. Groups	8	45.17***	54.46***
4. Periods (12 days each)	2	10.89**	24.36**
5. Subperiods (3 days each)	3	55	23
6. Incen. Cond. x *Oper Cond.*	3	9.74***	2.24
7. Periods x Subperiods	6	4.07**	2.99
8. Periods x Groups	16	7.46***	8.28***
9. Periods x Incen Cond.	2	2.69	10.75***
10. Periods x Oper Cond	6	4.04**	9.22**
11. *Subperiods* x Oper Cond.	9	.51	.78
12. Subperiods x Incen Cond.	3	.15	.36
13. Subperiods x Groups	24	1.09	1.16
14. Summed Error (2nd and 3rd Order Interactions)	105	—	—

**One per cent confidence level.
***One-tenth per cent confidence level

The results for device openings show the significant effect of Operative conditions and the Operative conditions x Periods interaction. Significant differences were also obtained between Periods and within the Periods x Incentive conditions interaction. Furthermore, significant differences are found between the two repeated groups and also the Periods x Groups interaction. These significant effects set the limits for individual comparisons (5, p. 406). The results for attacks are similar save for the fact that the interactions between Incentive conditions and Operative conditions and between Periods and Subperiods are significant and the interaction between Periods and Incentive conditions is not significant.

1. *The Effect on Performance of Prolonged Testing Without Food*

The total device openings for the No-Food Group are shown in Figure 2. The increase in total device openings from Period I to Period II, and the decrease from Period II to Period III are significant. No significant difference was found between Periods I and III. These data considered in connection with those of previous studies (3, 4) suggest that the increase in device openings from Period I to II resulted primarily from learning. The subsequent decrease may be a satiation effect, although the drop is particularly important for Group II and is apparently related to increasing daily mean temperatures.

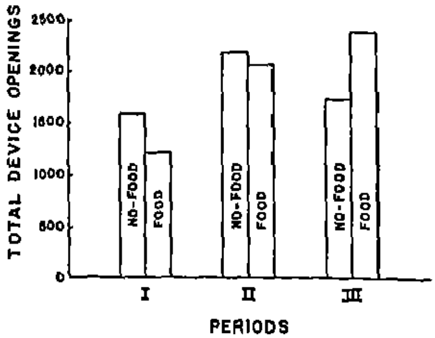

FIGURE 2
DEVICE OPENINGS BY THE FOOD AND NO-FOOD GROUPS

2. *The Effect of Food Introduction and Withdrawal on Puzzle Performance*

The effects of introduction and subsequent withdrawal of food on mechanical puzzle performance are also indicated in Figure 2. From this figure it can be seen that total number of device openings increased throughout the experiment for the Food group, whereas for the No-food group, total number of device openings initially increased then later decreased. The changing difference between the two groups over the three periods of the experiment is reflected in the significant Incentive condition x Period interaction.

3. *The Effect of Operative Conditions on Puzzle Performance Motivated by Manipulation Drive*

Operative conditions yielded the greatest differences in the experiment. Figure 3 shows the total device openings made by each of the four operative groups. Individual comparisons demonstrate that normal animals are significantly superior and the *EUD*'s significantly inferior to each of the other groups.

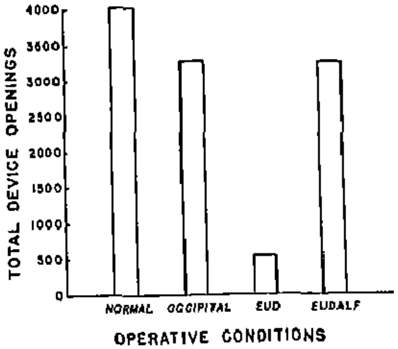

FIGURE 3
THE EFFECT OF OPERATIVE CONDITIONS ON DEVICE OPENINGS

The Incentive conditions x Operative conditions interaction was not significant for device openings but was significant for number of attacks. The normal and Occipital Food Groups attacked the puzzle more frequently than the corresponding No Food Groups, whereas the *EUD* and *EUDALF* Food Groups attacked the puzzle less frequently.

G. DISCUSSION

In this experiment, as in the Harlow, Harlow, and Meyer (4) and Harlow (3) studies, monkeys learned to solve a mechanical puzzle without food or other extrinsic incentive. In Figure 4 it can be seen that the introduction of food incentive appeared to have an inhibitory effect during the first six days, but subsequently was followed by a marked improvement in performance which continued into the final No-Food Period. This latter find-

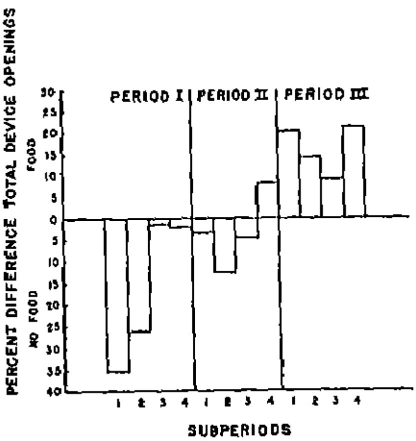

FIGURE 4

Per Cent Difference in Device Openings between Food and No-Food Groups

ing is in accord with secondary reinforcement theory. It was observed that initial decrement following food introduction was related to a *marked increase in attacks on the device directly over the food,* as was also found in a previous study (4). This initial effect of introducing food was a disruptive rather than the facilitative one found in the latent learning experiments of Blodgett (1), Tolman and Honzig (6), and Buxton (2).

The various operative groups yielded data which were completely unexpected and which do not permit any simple interpretation. On the basis of human operative literature it was expected that all large lesions would depress motivation related to manipulation or curiosity. This is exactly what occurred in the *EUD*'s, the monkeys with extensive unilateral decortication, but the monkeys with even greater damage, the *EUDALF*'s, showed a level of performance only 19 per cent below that of the normal subjects while the *EUD*'s were 86 per cent below the normal subjects. Furthermore, the *EUDALF*'s were not significantly different in performance from monkeys with unilateral occipital lobectomies, the operates with least extensive lesions. The results may be influenced by differential activity levels, for the *EUDALF*'s were by far the most active of any group and the *EUD*'s far less active, yet the occipitals and normals were even less active as measured during one day by the frequency of interruption of a light beam reflected around the cage and falling on a selenium cell. Thus amount of activity can be no more than a partial explanation of differences in manipulatory behavior, since it could only account for the differences between the most severely operated groups

The results of this paper in no way contradict the manipulation drive interpretation presented in earlier papers. The eventual improvement following introduction of food would be expected as an effect of adding another incentive to performance. We believe that there are countless instances of originally intrinsically motivated behaviors which are subsequently facilitated by such extrinsic incentives as food and liquid.

H. SUMMARY AND CONCLUSIONS

1. Manipulatory behavior is learned and maintained over a considerable period of time without extrinsic incentives.

2 The introduction of food-incentive produces initial decrement, then gradual improvement in performance as measured by total device openings. This is contrasted with results in "latent learning" experiments

3. Both extent and locus of lesion may operate as important determining factors in manipulatory behavior

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THE DIFFERENTIAL DECLINE OF SUBTEST SCORES OF THE WECHSLER-BELLEVUE INTELLIGENCE SCALE IN 60-69-YEAR-OLD INDIVIDUALS*

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A. PURPOSE

The purpose of this study was to determine the order of apparent decline of the Wechsler-Bellevue subtests in 60-69 year old individuals.

Evidence of differences in mean performance of the Wechsler subtests by the elderly has been presented in the literature by both Rabin (5) and Madonick and Solomon (4). The differences in mean scores of the subtests suggest that aging does not affect all abilities measured by the Wechsler test in equal manner. Rabin's 25 subjects were non-psychotic residents of a mental hospital and had an age range of 60-78 years with a mean of 65.2 years. They were of average intelligence. Madonick and Solomon tested 50 persons of bright normal mean intelligence who resided in two private homes for the aged. The age range was 60-85 years, and while the mean age was not reported, it may be estimated at about 73 years. The present study differs from those of Rabin and Madonick and Solomon in that the subjects were restricted to one age decade and were selected to be more representative of the general population of elderly persons than would be expected of Madonick and Solomon's private home residents or Rabin's small group of hospital admissions, half of whom were diagnosed as psychoneurotic. In order to eliminate possible shifts in the subtest order due to illiteracy, only persons having four or more years of formal schooling were included in this group.

B. SUBJECTS AND PROCEDURE

The Wechsler-Bellevue Intelligence Scale (6) was given to 50 white men and women whose native language was English. The age range was 60-69 years, with a mean 64.3 years. The number of grades of school

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attended ranged from 4 to 15, with a median of 8.1 grades. This value is very close to the median years of school completed by the 60-69 year old white population of the United States as stated in the 1940 census: namely, 8.3 for ages 60-64 and 8.2 for ages 65-69 (7). The range of full scale Intelligence Quotients was 82 to 137, with a mean of 100.8 and a standard deviation of 11.4. The subjects were chosen to sample mentally "normal" persons in the sixties. They were free of psychosis and of any neurological or other disorder which presumably might affect intellectual functioning. Sixteen of the 50 individuals tested were residents of a city home for the indigent aged, while 10 others were new admissions to this home. Subjects were also secured from four hospitals in the Baltimore area: five subjects were obtained from wards for chronic diseases and 19 were obtained from wards for acute medical problems. The subjects have been described in greater detail in another report (3).

The Intelligence Quotients of the Wechsler scale were calculated by means of the revised extrapolation formula given by Wechsler in the October, 1947, printing of his book, for ages not listed in his *IQ* tables. The subtest weighted scores reported here were not, however, corrected for age in any way. The subtests were ranked in order of mean weighted score, and *t* tests were made to determine the significance of differences between subtests.

C. RESULTS

Significant differences appeared in the mean scores of the Wechsler-Bellevue subtests in the present group of 60-year-old subjects (Tables 1 and 2) Since the subtests were designed by Wechsler to yield equated scores with all tests having a mean of 10 points, these significant differences presumably reflect a differential effect of aging. The lowest-ranking subtest, Digit Symbol, had a mean weighted score of 5.02. This value is only half as large as that of the highest-ranking subtest, Information, which had a mean of 10.46 (Table 1).

Only one of the 10 comparisons of adjacent ranked subtests, however, showed a mean difference significant at the one per cent level. Three sets of adjacent subtests had mean differences significant at the five per cent level, while six were not significant (Table 2). The mean scores in the middle of the range are practically identical (Table 1).

Some variations occur in the orders of difficulty found by the three investigators (Table 1). Small differences in the rank of a given test should not, however, be stressed, since in the present study the rank order placing of the tests in the middle range could have been determined by chance.

TABLE 1

RANK ORDER OF WECHSLER-BELLEVUE SUBTESTS FOR THREE ELDERLY GROUPS

Rank	Present study	Mean	*SD*	Rabin[a]	Madonick and Solomon[b]
1	Information	10.46	2 46	Information	Information
	(Vocabulary)	9.96	3.01	*(Not reported)*	(Not reported)
2	Comprehension	9.00	2 40	Comprehension	Comprehension
3	Arithmetic	8.06	3.00	Similarities	Similarities
4	P Completion	7 40	3.35	Digit Span	Obj. Assembly
5	Obj. Assembly	7 12	3.06	Arithmetic	Arithmetic
6	Digit Span	7.10	3 12	Obj Assembly	Digit Span
7	Similarities	7.08	3.32	P Completion[c]	Block Design
8	Block Design	6.08	2 56	Block Design	P Completion[c]
9	P. Arrangement	5 32	1 87	P Arrangement	P Arrangement
10	Digit Symbol	5.02	2 40	Digit Symbol	Digit Symbol
N	50			25	50
Mean Age	64 3			65.2	ab. 73
Age Range	60-69			60-78	60-85

[a] These subjects were Rabin's "Non-Psychotic" group of admissions to a state mental hospital *They were of average mean IQ, and half were diagnosed "psychoneurosis"* while the other half were diagnosed "without psychosis."

[b] These subjects were of bright normal mean *IQ* and were residents of private homes for the aged

[c] Each subtest ranks 7.5

TABLE 2

SIGNIFICANCE OF THE DIFFERENCES AMONG MEAN WEIGHTED SCORES OF WECHSLER-BELLEVUE SUBTESTS IN 50 PERSONS AGED 60-69

	Information	Vocabulary	Comprehension	Arithmetic	P Completion	Obj Assembly	Digit Span	Similarities	Block Design	P Arrangement
Vocabulary	1 85									
Comprehension	4 71	2 91								
Arithmetic	5 71	4 63	2 29							
P Completion	7 65	5 95	3.56	1 40						
Obj Assembly	6 55	4 90	3 76	1.65	60					
Digit Span	7 81	6 08	4.13	2 23	57	.04				
Similarities	9.66	7 78	5.33	2 08	71	.08	04			
Block Design	9 95	9 24	7.68	4.95	3 14	2.60	2 27	2.17		
P. Arrangement	14 68	11 90	10 82	6.37	5 07	4 50	3.63	4 29	2 11	
Digit Symbol	14 70	12 67	10 20	7 79	5 67	5 38	5.33	4 79	3.42	94

t at 1% = 2 680.
t at 5% = 2 009.

D. Discussion

On the basis of these and previous findings, the generalization can safely be made that Information, Vocabulary, and Comprehension show least age decline, while Block Design, Picture Arrangement, and Digit Symbol show greatest decline. The present results agree with previous studies showing no decline in vocabulary ability (2).

It is not known whether the tests which show a significant decline in the aged measure the same functions thoughout the age span. It is possible that new factors enter into the test performance of older persons which alter the nature of the task. Thus, a low digit symbol score in the aged might represent a different kind of deficit than a similar low score in the young.

It is apparent that any attempts at scatter analysis of subtest scores of older persons must take into account the demonstrated differential decline with age of these subtests.

These results show a differential decline with age of the mean scores of the Wechsler subtests. Unpublished results by the present investigators have also indicated a significant shift with age of the relative difficulty of items within a single subtest (1). The Wechsler vocabulary subtest was given to 404 subjects aged 36-91 years, about 75 per cent of whom were 60 or older. When the items were ranked in order of difficulty for this group, only four of the 42 words retained their original positions in the list, and shifts of four or more places occurred for 17 of the words. It is likely that for aged subjects, the order of item difficulty of other subtests may shift from that of the young standardization group.

E. Summary

1. The purpose of the study was to determine the order of decline of mean weighted scores of the Wechsler-Bellevue Intelligence Scale subtests in persons aged 60-69.

2. The test was administered to 50 white men and women whose native language was English, who had had four or more grades of schooling, and who were free of diseases which might presumably affect intellectual functioning.

3. When the subtests were ranked in order of decreasing mean weighted score, it was found that there were significant differences in subtest scores. Adjacent subtests, however, did not in general differ significantly in mean score. Information, Vocabulary, and Comprehension showed least decline, while Block Design, Picture Arrangement, and Digit Symbol showed greatest decline. Because of the differential decline in the subtest scores with age,

scatter analysis of such scores must take into account the age of the individual.

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The Journal of Genetic Psychology, 1950, 77, 319-326

BOOKS

The *Journal of Genetic Psychology*, the *Journal of General Psychology*, and the *Journal of Social Psychology*, will buy competent reviews at not less than $2 per printed page and not more than $3 per printed page, but not more than $15 00 for a single review.

Conditions. Only those books that are listed below in this section are eligible for such reviews In general, any book so listed contains one or more of the following traits. (*a*) Makes an important theoretical contribution, (*b*) consists largely of original experimental research, (*c*) has a creative or revolutionary influence in some special field or the entire field of psychology, (*d*) presents important techniques.

The books are listed approximately in order of receipt, and cover a period of not more than three years. A reviewer must possess the Ph D. degree or its equal in training and experience

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CRITICAL REVIEWS OF RECENT BOOKS

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(Lowenthal, L., & Gutterman, N. Prophets of Deceit: A Study of the Techniques of the American Agitator. (Studies in Prejudice Series.) New York: Harper, 1949. Pp. 164.)

Reviewed by Charles A. Wellis

This recent work sponsored by the Department of Scientific Research of the American Jewish Committee presents a heuristic psychoanalytic account of the American agitator's "technique of persuasion."

At the risk of stating the obvious one may remark that the reading of treatises which call themselves a "psychoanalytic" this or that is one of the intellectual adventures of the day. Rarely can the reader be quite sure initially just what content is going to be presented under that heading. To be sure, some psychoanalytic writers are sufficiently prolix to enable one to have some feelings of ease in this respect. Thus, if we use Freud as a standard, Dr. Clara Thompson is plainly heterodox in her psychoanalytic theory. However, one would gather from the casual sideswipes which she takes at brief psychotherapists that she holds to fairly conventional notions about therapy, at least insofar as length of therapy is concerned. On the other hand, Dr. Franz Alexander, who is no rabid radical in theorizing, is an innovator in therapeutic methods. Sullivan reads suspiciously like an empirically minded non-psychoanalytic child psychologist. Kubie is willing to let the theoretical and therapeutic chips fall where they may providing the chipper has had conventional psychoanalytic training. And Fromm and Horney, in the field of theory, have become enamored of typology—a Procrustean will-o-the-wisp which for some centuries now has bedazzled students of the mental life, analytically minded or otherwise. If one may do so without being fatuous, from these few examples one may conclude that without the master himself to act as a board of censorship, "psychoanalysis" seems to be in danger of becoming one of those terms which the general semanticists call "under-defined."

It is relevant, therefore, to make an issue of the fact that when Lowenthal and Gutterman state that they are adopting a psychoanalytic approach, they use that term as signifying a strict adherence to Freudian concepts. Once that point is clear to the reader he can peruse *Prophets of Deceit* with the comfortable feeling that he knows what, psychologically speaking, is coming next.

Society acts as a coercive, punitive restrictor of the instinctual impulses (pp 21, 51, 88). Thanks to the strains and stresses resulting from the Industrial Revolution our society is in a pretty bad way. Our value frames of reference have been disrupted. This all results in a lack of canalization of the libidinal impulses which, in turn, leads to anxieties and restlessness and a psychological response in the individual of helplessness and of isolation.

The influence of the writings and of the speeches of the agitator, then, cannot be understood in terms of their manifest content, but rather in terms of the implicit appeal which they make to the psyche. For just a few examples, curiosity which is a "universal feature of contemporary culture" (sic) stems from the individual's "unconscious infantile desires to glimpse the forbidden life of the grown-up" (p. 122). Consequently, "when the hearer is treated as an insider his libido is gratified" (p. 122). The agitator's practice of viewing Jews as being both bankers and Communists is an appeal to ambivalent Oedipal emotions (p. 45). Similarly, negative reactions to the admission of displaced persons into this country are to be interpreted as symbols of the psyche's rejection of "vague unconscious urges" (p. 51).

Lowenthal and Gutterman develop these theses through an analysis of extensive quotations from the oral and written productions of our native would-be fuehrers—Hudson, Mote, Pelley, Smith, Winrod, *et al.* (From the dates of the quotations one would gather that of these gentry Gerald K. Smith and E N. Sanctuary are the sole survivors of the last war.) A review of the psychological constructs of the 10 chapters of *Prophets of Deceit* would run something like this The function of society is to encourage repression. Our society is in a disrupted condition due to the Industrial Revolution and hence, fails in its task The result is that the individual possesses a great deal of free-floating affect and feels alone and helpless in the face of events which are incomprehensible. The agitator appeals to the individual by first of all emphasizing his sense of helplessness. This is done by offering the psyche an external object for libidinal displacement which possesses "ruthless power" The Jew is this object. However, the leader is charismatically endowed. If the individual will follow him, the enemy can be destroyed in ways which will allow of the discharge of libidinal impulses. From the foregoing it may be seen that the appeals of the agitator are psychologically consistent, although objectively they often make little sense.

It is the opinion of this reviewer that, considering the spate of socio-psychological analyses which have appeared in the last decade, very little of what Lowenthal and Gutterman have to say is particularly novel, except for the social context in which it is said. In addition, critical evaluation in an extensional sense of a line of thought such as this poses considerable difficulty, since whatever one might wish to say about it has been said numerous times before and at some length. One might wish, for example, to categorize unfavorably as being glib and superficial the discussion of current social malaise. One might wish to question the general validity of a depiction of dynamics which have been developed within the matrix of what is after all a pretty localized social and economic setting. One might wish to do so, but then one remembers Malinowski's classical rebuttals to Freud's cultural analyses. So, with point after point an attempt to analyze the value or lack of value of the suggested insights offered by Lowenthal and Gutterman would involve one in the, to this reviewer, largely intensionally oriented controversies concerning the validity of Freudian concepts.

In only one point do the writers of *Prophets of Deceit* raise an issue which does not appertain to their sturdy adherence to Freudian themes. This point seems to result from their announced intention of adopting a "scientific" approach. For Lowenthal and Gutterman the word scientific is evidently used in the sense that events must be explicable in contemporary terms. This approach leads them to classify a philosopher of the stature of Berdyaev as being really an agitator at heart since Berdyaev questioned the adequacy of positivism for explaining Anti-Semitism. In fact, our writers make the curious claim that only the agitator speaks of Anti-Semitism as a historical phenomenon. One wonders how they reconcile a contemporary positivistic approach with the observance of Chanukah and Purim—festivals which, to put it mildly, may lay considerable claim to antiquity.

In summary, *Prophets of Deceit* is an attempt to discern from an analysis of the speeches and writings of our American agitators the psychological appeals made by these men as these appeals relate to Anti-Semitism. The approach is conventionally Freudian. In the final analysis, since current psychological thinking probably represents an uneven continuum from altogether Freudian to altogether non-Freudian thought, the reaction of the reader will depend upon the particular point of that continuum at which he is to be found.

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(There will always be two pages of book titles, listed in the order of receipt, i e., the most recently received books will be found at the end of the list.)

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ABBREVIATIONS OF WORDS USED IN THE TITLES OF JOURNALS

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Abnormal	*Abn.*	Japanese	*Jap.*
Abstracts	*Abst.*	Journal	*J.*
American	*Amer.*	Mathematical	*Math.*
Anatomy	*Anat.*	Measurement	*Meas.*
Animal	*Anim.*	Medical	*Med.*
Applied	*Appl.*	Mental	*Ment.*
Archives	*Arch.*	Monographs	*Monog.*
Association	*Asso.*	Neurology	*Neurol.*
Attitude	*Att.*	Opinion	*Opin.*
Australian	*Aust.*	Orthopsychiatry	*Orthopsychiat.*
Behavior	*Behav.*	Personality	*Personal.*
British	*Brit.*	Personnel	*Person.*
Bulletin	*Bull.*	Philosophy	*Philos.*
Bureau	*Bur.*	Physics	*Phys.*
Canadian	*Can.*	Physiology	*Physiol.*
Character	*Charac.*	Proceedings	*Proc.*
Children	*Child.*	Psychiatry	*Psychiat.*
Chinese	*Chin.*	Psychoanalysis	*Psychoanal.*
Clinical	*Clin.*	Psychology	*Psychol.*
College	*Coll.*	Psychosomatic	*Psychosom.*
Comparative	*Comp.*	Quarterly	*Quart.*
Consulting	*Consult.*	Religious	*Relig.*
Contributions	*Contrib.*	Research	*Res.*
Development	*Devel.*	Review	*Rev.*
Educational	*Educ.*	School	*Sch.*
Experimental	*Exper.*	Science	*Sci.*
General	*Gen.*	Social	*Soc.*
Genetic	*Genet.*	Studies	*Stud.*
Indian	*Ind.*	Teacher	*Teach.*
Industrial	*Indus.*	University	*Univ.*
International	*Internat.*	Statistics	*Stat.*
Italian	*Ital.*		